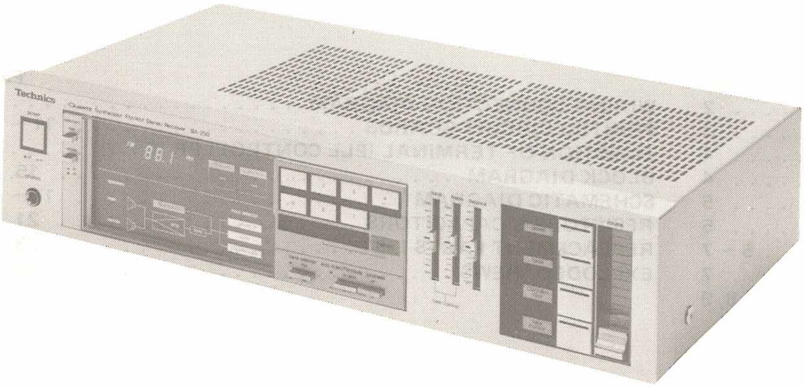
ORDER NO. HAD84022714C1

Service Manual

QUARTZ Synthesizer FM/AM Stereo Receiver

SA-250

[M], [MC]



Areas

* [M] is available in the U.S.A.
* [MC] is available in Canada.

Specifications

Specifications are subject to change without notice for further improvement.
Weights and dimensions shown are approximate.

(IHF '78)

■ AMPLIFIER SECTION

Rated minimum sine wave RMS power output
20 Hz~20 kHz both channels driven
0.07% total harmonic distortion
35W per channel (8 ohms)

1 kHz continuous power output both channels driven 0.07% total harmonic distortion	37W per channel (8 ohms)
Dynamic headroom	1.2 dB (8 ohms)
Total harmonic distortion	
rated power at 20 Hz~20 kHz	0.07% (8 ohms)
rated power at 1 kHz	0.02% (8 ohms)
SMPTE intermodulation distortion	0.07% (8 ohms)
Frequency response	
PHONO	RIAA standard curve ±0.8 dB
CD/VIDEO/AUX, TAPE/EXT	5 Hz~70 kHz, −3 dB
Input sensitivity	
PHONO	0.45 mV (2.5 mV, IHF '66)
CD/VIDEO/AUX, TAPE/EXT	25 mV (150 mV, IHF '66)
S/N (IHF, A)	
PHONO	74 dB (72 dB, IHF '66)
CD/VIDEO/AUX, TAPE/EXT	80 dB (95 dB, IHF '66)
Maximum input voltage	
PHONO	150 mV (160 mV, 1 kHz)
Input impedance	
PHONO	47 kilohms
CD/VIDEO/AUX, TAPE/EXT	22 kilohms
Tone controls	
BASS	50 Hz, +10 dB~ −10 dB
TREBLE	20 kHz, +10 dB~ −10 dB
Loudness control (volume at −30 dB)	50 Hz, +9 dB
Low frequency damping factor	30 (8 ohms)
Load impedance	
MAIN or REMOTE	8~16 ohms
MAIN and REMOTE	8~16 ohms

■ FM TUNER SECTION

Frequency range	87.9~107.9 MHz
Sensitivity	10.8 dBf (1.9 μV, IHF '58)
50 dB quieting sensitivity	
MONO	16.1 dBf (3.5 μV IHF '58)
STEREO	38.3 dBf (45 μV IHF '58)
Total harmonic distortion	
100 Hz	0.15% (MONO), 0.3% (STEREO)
1 kHz	0.15% (MONO), 0.3% (STEREO)
6 kHz	0.3% (MONO), 0.3% (STEREO)
S/N	
MONO	77 dB
STEREO	71 dB
Frequency response	20 Hz~15 kHz, +1 dB, −2 dB
Alternate channel selectivity	65 dB
Capture ratio	1 dB
Image rejection at 98 MHz	50 dB
IF rejection at 98 MHz	75 dB
Spurious response rejection at 98 MHz	82 dB
AM suppression	50 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	−35 dB
38 kHz	−50 dB
Antenna terminals	300 ohms (balanced) 75 ohms (unbalanced)

Technics

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Secaucus,
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Panasonic Sales Company Division of Matsushita Electric of Puerto Rico, Inc.
Ave, 65 De Infanteria, KM 9.7
Victoria Industrial Park
Carolina, Puerto Rico 00630

■ AM TUNER SECTION

Frequency range	530~1620 kHz
Sensitivity	20 μV, 300 μV/m
Selectivity	55 dB
Image rejection at 1000 kHz	40 dB
IF rejection at 1000 kHz	60 dB

■ GENERAL

Power consumption	165W
Power supply	AC 120V, 60 Hz
Dimensions (W×H×D)	430 × 97 × 243 mm (16-15/16" × 3-13/16" × 9-9/16")
Weight	4.8 kg (10.6 lb.)

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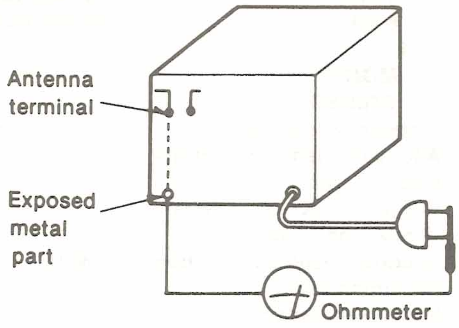
■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

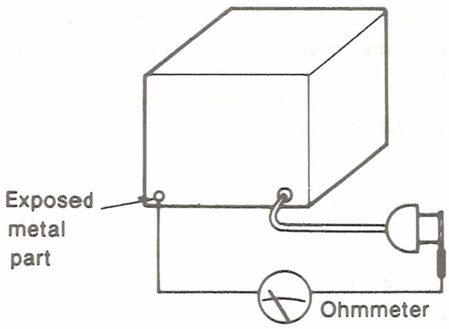
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ

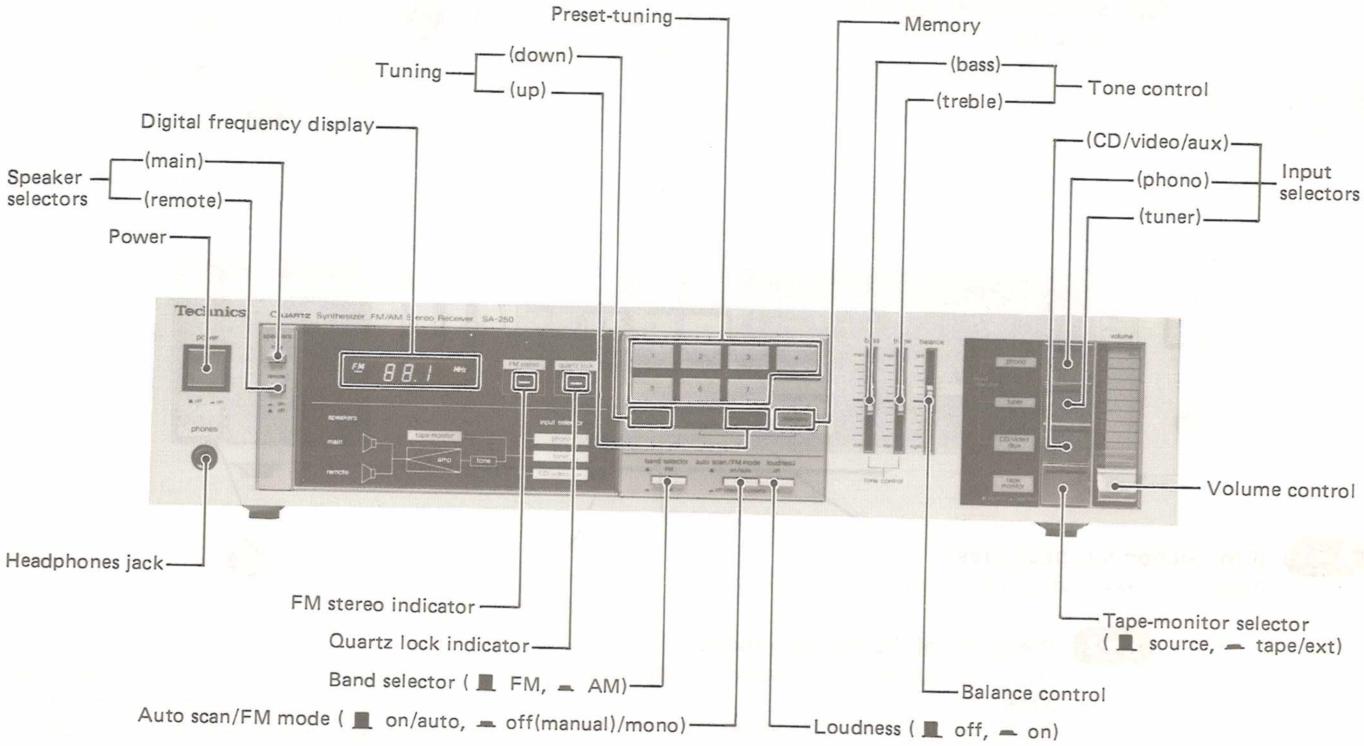


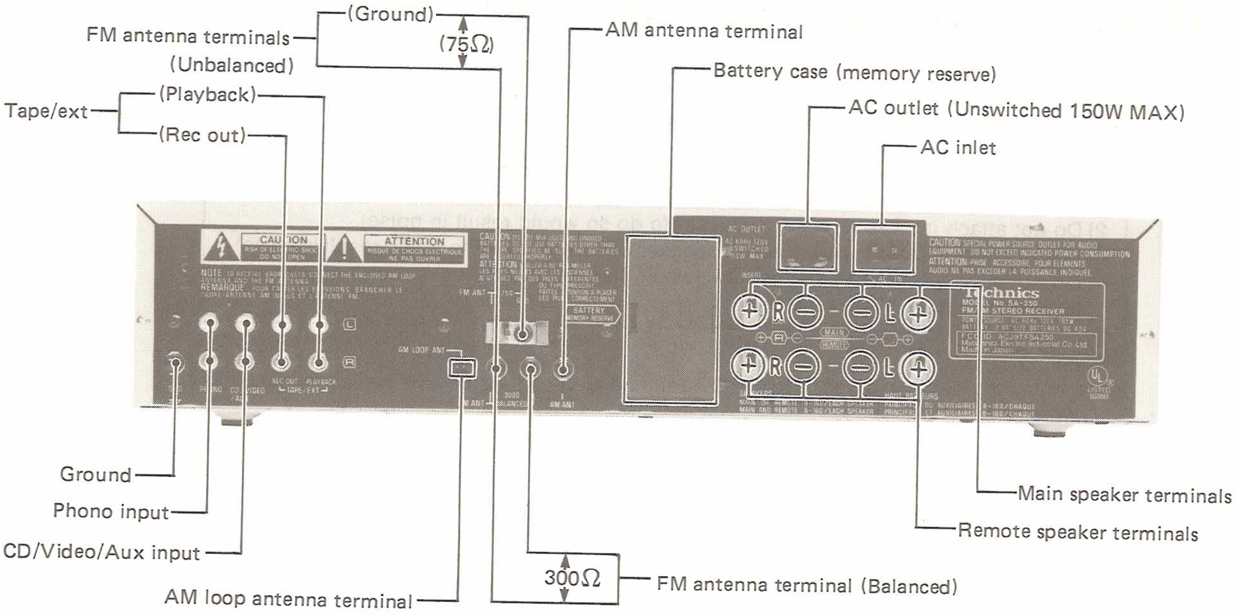
(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ LOCATION OF CONTROLS

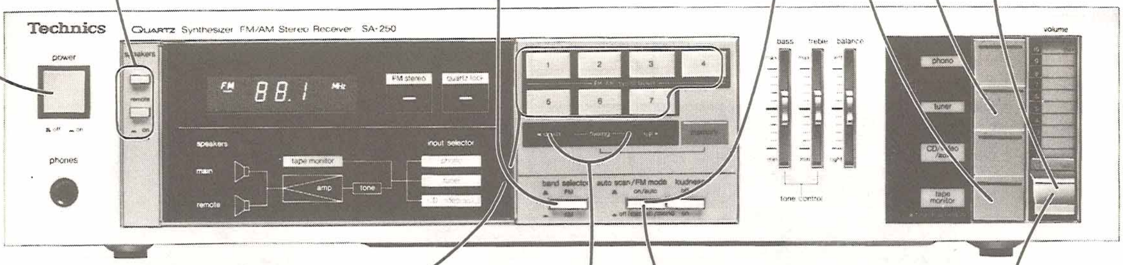

Preset-tuning
Memory
Tuning
(down)
(up)
(bass)
(treble)
Tone control
Digital frequency display
(CD/video/aux)
Input selectors
(phono)
(tuner)
Speaker selectors
(main)
(remote)
Power
Volume control
Headphones jack
Tape-monitor selector
(▉ source, ▬ tape/ext)
FM stereo indicator
Quartz lock indicator
Band selector (▉ FM, ▬ AM)
Balance control
Auto scan/FM mode (▉ on/auto, ▬ off(manual)/mono)
Loudness (▉ off, ▬ on)


(Ground)
FM antenna terminals
(Unbalanced)
(75Ω)
AM antenna terminal
Battery case (memory reserve)
Tape/ext
(Playback)
(Rec out)
AC outlet (Unswitched 150W MAX)
AC inlet
Ground
Phono input
CD/Video/Aux input
AM loop antenna terminal
300Ω
FM antenna terminal (Balanced)
Main speaker terminals
Remote speaker terminals

- Phono input capacitance is about 150pF.
- Series connection method is employed for the main and remote speaker connections of this set. Therefore, if both speaker changeover switches (main and remote) are turned "on" with the speaker unit connected only to main or remote speaker terminal, then no output signal will be delivered from the speaker unit.

OPERATION

- To listen to radio broadcasts


Technics
QUARTZ Synthesizer FM/AM Stereo Receiver SA-250
power
phones
speakers
main
remote
88.1 MHz
FM stereo
quartz lock
tape monitor
amp
tone
input selector
phono
tuner
CD/video/aux
memory
band selector
auto scan/FM mode
loudness
bass
treble
balance
tone control
volume

① "0→1"
Set volume control to low position for easier tuning.

② "tuner" (█–▂)

③ "source" (▂–█)

④ "on/auto" (▂–█)

⑤ "FM" (▂–█):
for FM broadcasts
"AM" (█–▂):
for AM broadcasts

⑥ Select speaker systems to be used.
(See the "Note" above.)

⑦ Power: "on"
(█–▂)

8-1 **If the station has been preset:**
Press the corresponding preset-tuning button.

8-2 **Press one of the tuning buttons.**
(The broadcast station will automatically be selected.)
Note:
If automatic selection can not be made, set the automatic-scan/FM mode selector to the "off (manual)/mono" position and then tune manually.

⑨ Adjust volume level.

● If the broadcast signal is weak, or if there is a large amount of interference in a stereo broadcast, set to the "off (manual)/mono" position.

HOW TO ATTACH THE AM LOOP ANTENNA

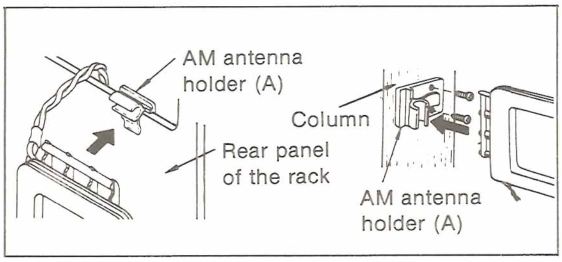
This unit includes an AM loop antenna. No outdoor antenna is necessary unless the broadcast signals in your area are especially weak. (Connect the loop antenna even if an outdoor antenna is used; if it is not connected, AM reception will not be possible.)

Pay attention to the following points when attaching the antenna.
1) Do not attach it horizontally (to do so would impair reception).
2) Do not attach it close to metal surfaces (to do so would result in noise).
3) Do not attach it close to power cords, speaker wires, etc. (to do so would result in noise).
4) Do not attach it close to a tape deck (when the tape deck is being used, chirping or beeping sounds may be received).

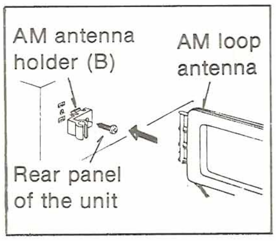
Steps

1. Connect the AM loop antenna to the AM antenna terminals located on the rear panel of the unit.
2. Find the height and direction of the antenna where reception is best and then fix it vertically to the wall, rack, etc.

1) When attaching the antenna to a wall, column or rack.


AM antenna holder (A)
Column
Rear panel of the rack
AM antenna holder (A)

2) When attaching the antenna to the unit.


AM antenna holder (B)
AM loop antenna
Rear panel of the unit

Note:
The installation of the antenna to the unit may cause impaired reception or result in signal noise. If possible, attach the antenna to the rack, a wall, or a column.

3. Move the antenna toward the right or left to find the point of best reception.

PROTECTION CIRCUITRY

The protection circuitry may have operated if eigher of the following conditions is noticed:

- No sound is heard when the power is turned on.
- Sound stops during performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker with an impedance less than the indicated rated impedance of the amplifier are used.

If this occurs, follow the procedure outlined below:

1. Turn off the power.
2. Determine the cause of the problem and correct it.
3. Turn on the power once again

Note:
When the protection circuitry functions the unit will not operate unless the power is first turned off and then on again.

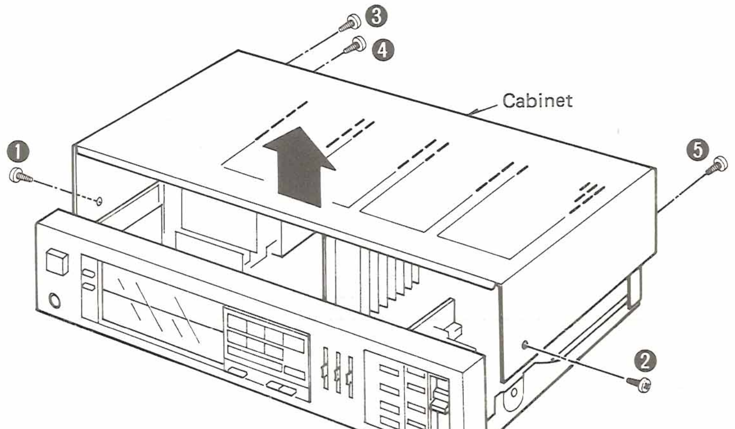
BEFORE REPAIR AND ADJUSTMENT

1. Turn off the power supply and short-circuit of the power supply capacitors (C706, C707, 6800μF) with a resistor (about 10Ω, 5W) to discharge the charged voltage. Do not short both ends of C706 and C707 with a screwdriver. It may damage the component.
2. Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current at 120V, 60Hz in no-signal mode is 100 ~ 400mA.

DISASSEMBLY INSTRUCTIONS

How to remove the cabinet

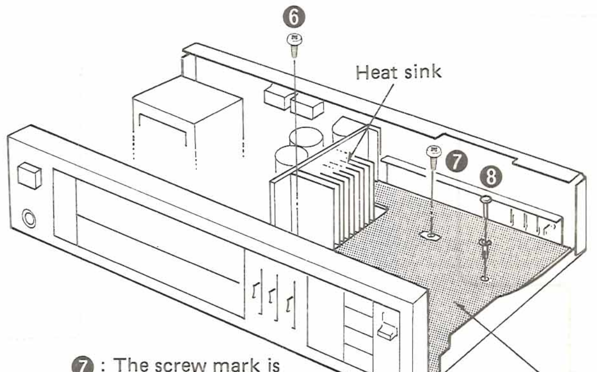
1. Remove the 2 setscrews (Fig. 1: ①, ②) on the side and 3 setscrews (Fig. 1: ③ ~ ⑤) on the back of the cabinet.
2. Remove the cabinet upward.


③
④
Cabinet
①
⑤
②

[Fig. 1]

How to remove the bottom board

1. Remove the 2 setscrews (Fig. 2: ⑥, ⑦) and 1 lock pin (Fig. 2: ⑧) of the main P.C.B. and heat sink.
2. Remove the 8 setscrews (Fig. 3: ⑨ ~ ⑯) of the bottom board.
3. Remove the bottom board upward.


⑥
Heat sink
⑦
⑧
Main P.C.B.

[Fig. 2]

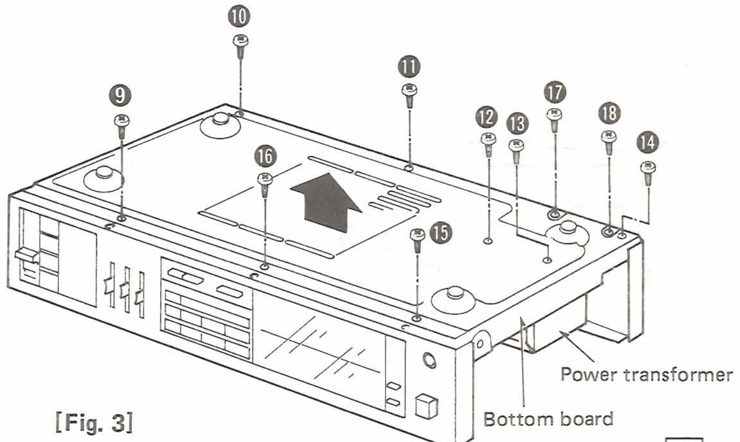
⑦ : The screw mark is indicated on the P.C.B.

How to remove the power amplifier IC

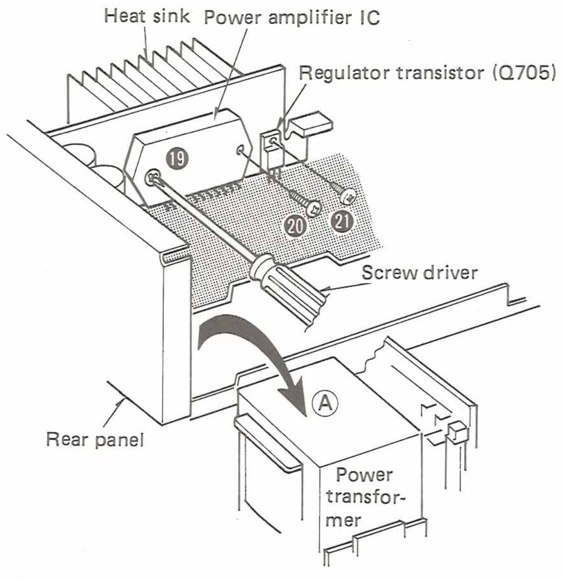
1. Remove the cabinet and bottom board.
2. Remove the 2 setscrews (Fig. 3: ⑰, ⑱) of the power transformer.
3. Detach the power transformer from rear panel in the direction of arrow Ⓐ (Fig. 4).
4. Unsolder of power amplifier IC.
5. Remove the 2 setscrews (Fig. 4: ⑲, ⑳) used to secure the power amplifier IC on the heat sink, and then pull the power amplifier IC.
6. When mounting the power amplifier IC, apply silicone compound (SZZ0L15) to the rear side of power amplifier IC, and then follow the steps 1 ~ 5 reversely.

How to remove the regulator transistor (Q705)

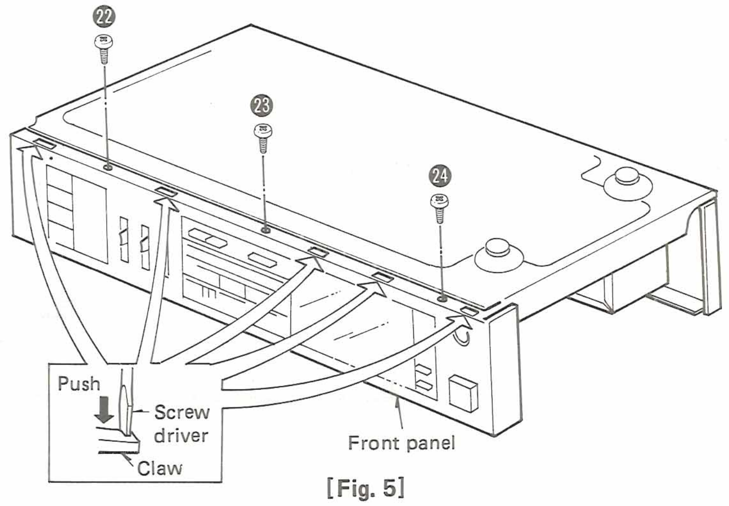
1. Remove the cabinet and bottom board.
2. Unsolder of regulator transistor (Q705).
3. Remove the 1 setscrews (Fig. 4: ㉑).
4. When mounting the regulator transistor, apply silicone compound (SZZ0L15) to the rear side of regulator transistor, and the follow the steps 1 ~ 3 reversely.


⑩
⑪
⑨
⑰
⑫
⑬
⑱
⑭
⑯
⑮
Power transformer
Bottom board

[Fig. 3]


Heat sink
Power amplifier IC
Regulator transistor (Q705)
⑲
⑳
㉑
Screw driver
Rear panel
Ⓐ
Power transfor-mer

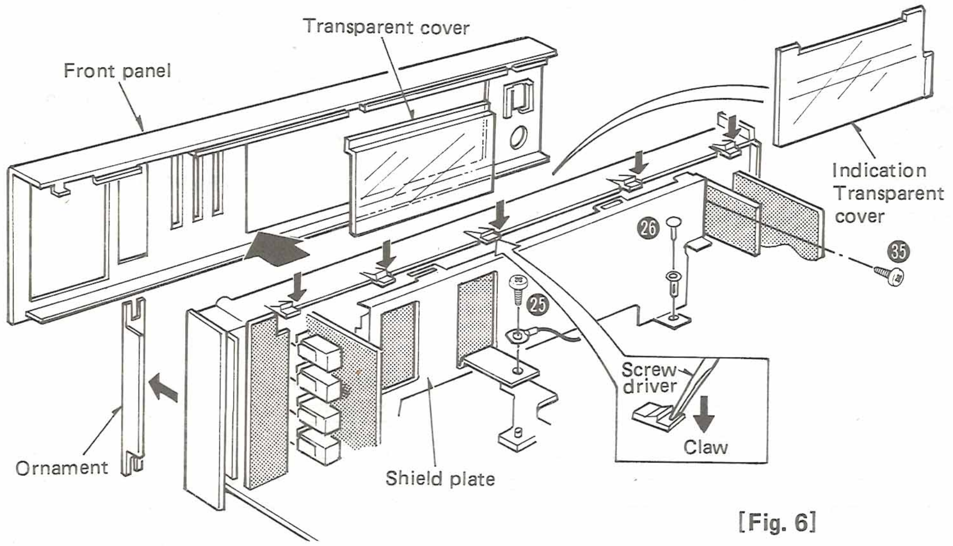
[Fig. 4]


㉒
㉓
㉔
Push
Screw driver
Claw
Front panel

[Fig. 5]

How to remove the front panel

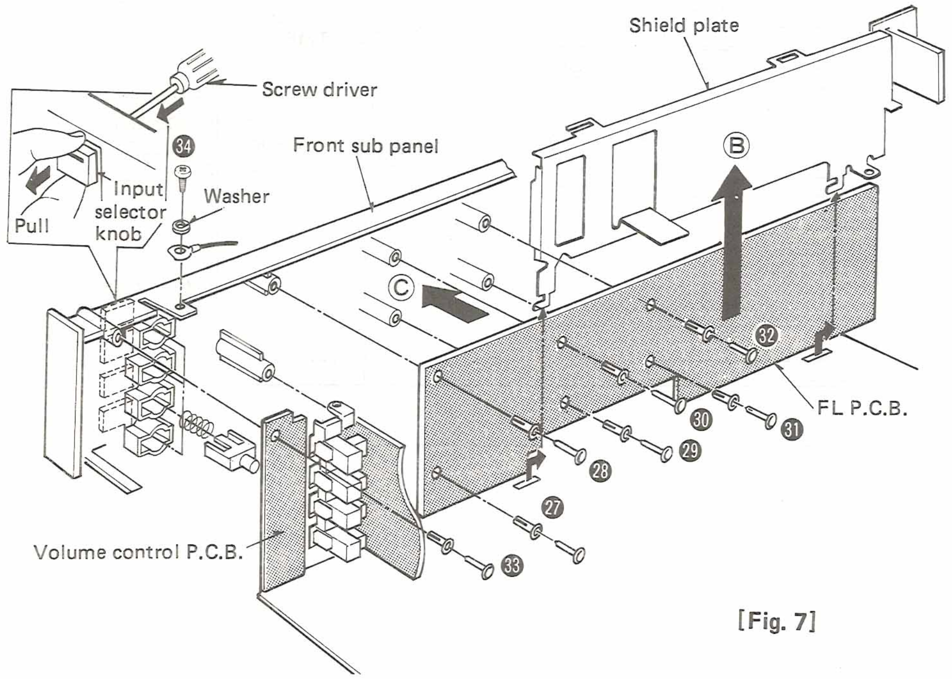
1. Remove the cabinet.
2. Remove the 3 setscrews (Fig. 5: ㉒ ~ ㉔) of the front panel.
3. Release the 5 claws (Fig. 5) at the under of the front panel grille and 5 claws (Fig. 6) at the top of the front panel grille, and then remove the front panel.


Transparent cover
Front panel
Indication Transparent cover
㉖
㉟
㉕
Screw driver
Claw
Ornament
Shield plate

[Fig. 6]

How to remove the front sub panel

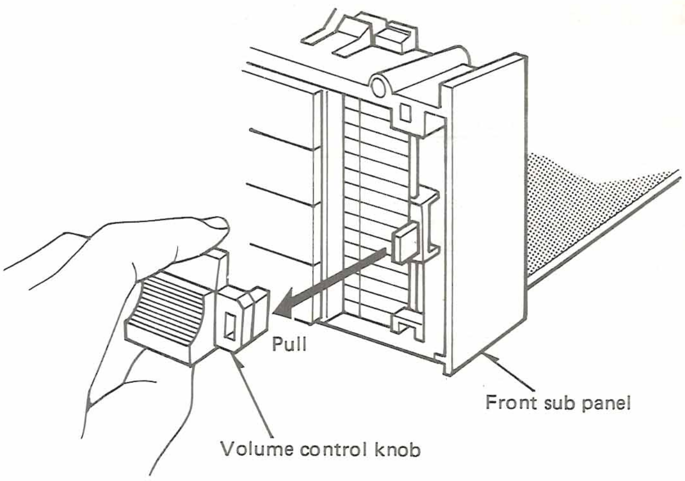
1. Remove the cabinet and front panel.
2. Remove the 2 setscrews (Fig. 6: ㉕, ㉟) and 1 lock pin (Fig. 6: ㉖).
3. Remove the shield plate in the direction of the arrow Ⓑ (Fig. 7).
4. Remove the 6 lock pins (Fig. 7: ㉗ ~ ㉜) of the FL P.C.B.
5. Remove the 1 lock pin (Fig. 7: ㉝) of the volume control P.C.B.
6. Remove the 4 knobs (Fig. 7).
7. Remove the 1 setscrew (Fig. 7: ㉞) at the top of the front sub panel grille.
8. Remove the front sub panel in the direction of the arrow Ⓒ (Fig. 7).


Shield plate
Screw driver
Front sub panel
㉞
Ⓑ
Input selector knob
Washer
Pull
Ⓒ
㉜
FL P.C.B.
㉚
㉛
㉙
㉘
㉗
㉝
Volume control P.C.B.

[Fig. 7]

- **How to remove the volume control knob**

1. Remove the cabinet and front panel.
2. Pull out the volume control knob (Fig. 8).


Pull
Front sub panel
Volume control knob

[Fig. 8]

TERMINAL GUIDE OF TRANSISTORS, DIODES AND IC'S

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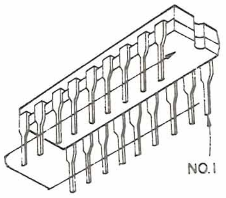
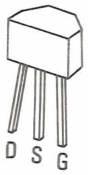
<tr><td colspan="3"> <table><tr><td>AN6873N</td><td>18pin</td></tr><tr><td>AN7273A</td><td></td></tr><tr><td>SVID1703C544</td><td>28pin</td></tr><tr><td>SVIμPB553C-E</td><td>8pin</td></tr><tr><td>SVINJ4559DDM</td><td></td></tr><tr><td>SVINJ4558DSM</td><td></td></tr><tr><td>SVIμPC1161C3</td><td>16pin</td></tr></table></td><td>2SK241
 </td></tr>
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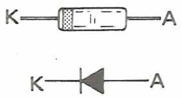
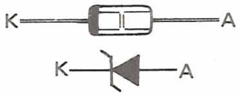
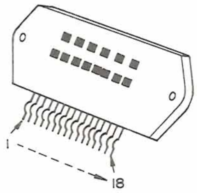
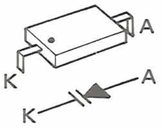
MA27W–A</td><td>SVDISR35200A,
MA1062M, MA1160M
MA1220L, MA1068M</td><td>STK4152-2M</td><td>MA320G1NMS</td></tr>
<tr><td> </td><td> </td><td> </td><td> </td></tr>
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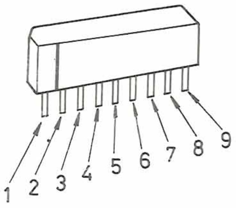
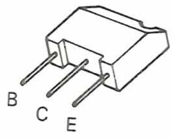
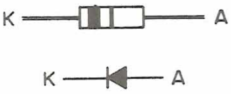
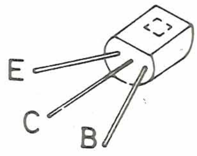
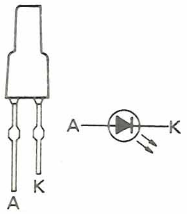
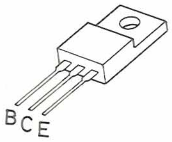
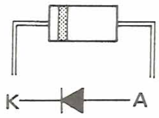
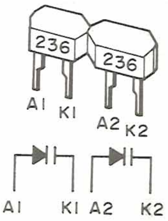
2SC1674, 2SC945
2SC1815, 2SC1675</td></tr>
<tr><td> </td><td> </td><td> </td><td> </td></tr>
<tr><td>LN846RP</td><td>2SD1265</td><td>SVDS2V20</td><td>SVDKV1236Z</td></tr>
<tr><td> </td><td> </td><td> </td><td>

236
236
A1 K1
A2 K2
A1 K1 A2 K2

</td></tr>
</table>

MEASUREMENTS AND ADJUSTMENTS

Note: AM OSC coil (L202) and AM IFT (T201) have been already adjusted, and require no adjustment.

AM ADJUSTMENT

*** Setting and Equipment used**

1. AC electronic voltmeters (VTVM)
2. AM signal generator (AM-SG)
3. Set band selector to "AM" position.
4. Maintain line voltage at 120 volts.
5. Output of signal generator should be no higher than necessary to obtain an output reading.
6. Use a non-metal screwdriver for the adjustment.

Step No.	AM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	CONNECTION	FREQUENCY				
	AM-RF ADJUSTMENT					
1	Connect AM-SG to AM antenna terminal through 200pF capacitor referring to Fig. 9.. (Weak input)	610kHz (30% Mod. with 400Hz)	610kHz	Connect AC VTVM or scope to "speaker" terminal of the set.	L201 (ANT Coil)	1. Adjust for maximum output. 2. Adjust core of L201 by screwdriver.
2		1500kHz (30% Mod. with 400Hz	1500kHz	Connect AC VTVM or scope to "speaker" terminal of the set.	CT201 (ANT Trimmer)	1. Adjust for maximum output. 2. Repeat steps (1) and (2) until the frequency correctly matches the frequency display.

FM ADJUSTMENT

*** Setting and Equipment used**

1. FM signal generator (FM-SG)
2. Oscilloscope.
3. DC electronic voltmeters (VTVM).
4. Frequency counter (19kHz and 108MHz measurable).
5. Set band selector to "FM" position.
6. Set automatic-scan/FM mode selectot to "off/mono" position.
7. Other setting are the same as in AM adjustment.

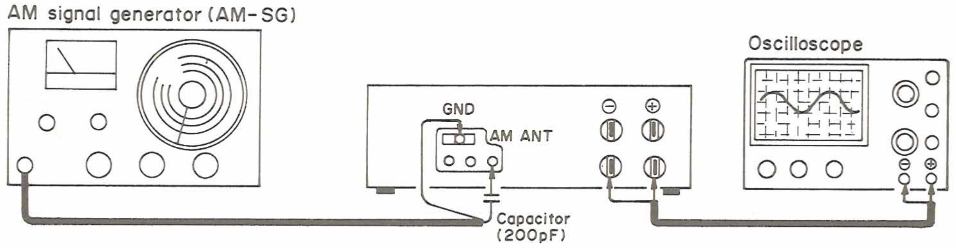
*** Preparation of FM signal generator (FM-SG)**

1. The standard input of the set is 60dB(1mV), 400Hz 100% modulation.
   (Because of attenuation, using coaxial cables. SG output must be 6dB plus (IHF). That is, when input 60dB, SG output is to be 66dB.)

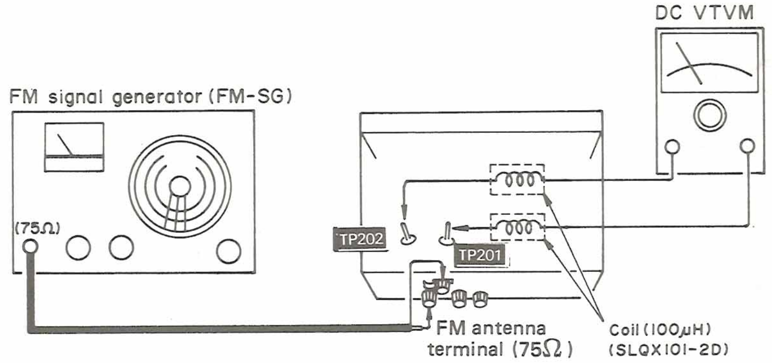
Step No.	FM SIGNAL GENERATOR		DISPLAY FREQUENCY	PREPARATIONS	PARTS ADJUSTED	ADJUSTING PROCEDURE
	CONNECTION	FREQUENCY				
	FM-IF ADJUSTMENT					
3	Connect FM-SG to FM antenna terminal referring to Fig. 10. (Apply 60dB to antenna terminal)	100.0MHz (100% Mod. with 400Hz)	100.0MHz	Connect DC VTVM to between TP201 and TP202 through choke coil (Refer to Fig. 10)	T202 (Discri. IFT)	1. Adjust T202 core so that voltage measured in signal mode is 0mV in 300mV range.
	FM-RF ADJUSTMENT					
4	Connect FM-SG to FM antenna terminal. (Weak input)	90 MHz (100% Mod. with 400 Hz)	90 MHz	Connect scope to "Speaker" terminals of the set.	L105 (OSC Coil)	1. Adjust for maximum output 2. Repeat steps (4) and (5).
5		106 MHz (100% Mod. with 400 Hz)	106 MHz	Connect scope to "Speaker" terminals of the set.	CT101 (OSC Trimmer)	

FM MPX PILOT (VCO) ADJUSTMENT

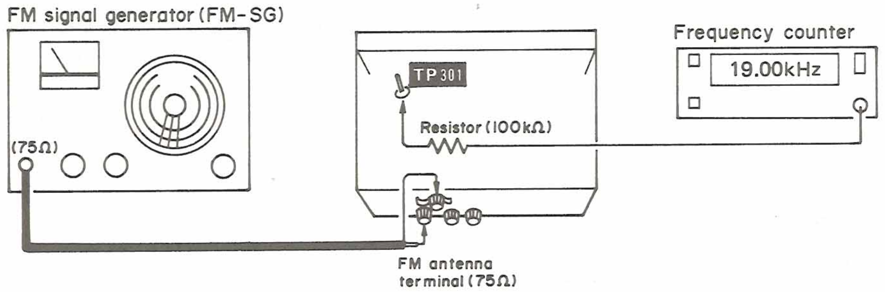
Step No.	USING A FREQUENCY COUNTER	USING ALTERNATE SYSTEM
6	1, 100.0 MHz 60 dB Non-modulated mono signal applied to set. (Refer to Fig. 11) 2. Set automatic-scan/FM mode selector to "on/auto" position. 3. Connect frequency counter to TP301 through resistor (100kΩ). 4. Adjust **VR301** to 19kHz ± 30Hz.	1. Apply stereo signal from generator or stereo station to tuner. 2. Adjust **VR301** until stereo indicator lights up. Cement arm of **VR301** as shown in Fig. 12.


AM signal generator (AM-SG)
GND
AM ANT
Capacitor (200pF)
Oscilloscope

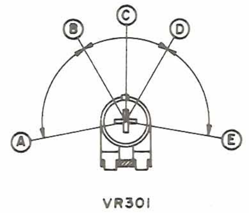
[Fig. 9]
AM-RF adjustment


DC VTVM
FM signal generator (FM-SG)
(75Ω)
TP202
TP201
FM antenna terminal (75Ω)
Coil (100μH) (SLQX101-2D)

[Fig. 10]
FM-IF adjustment


FM signal generator (FM-SG)
(75Ω)
TP301
Resistor (100kΩ)
Frequency counter
19.00kHz
FM antenna terminal (75Ω)

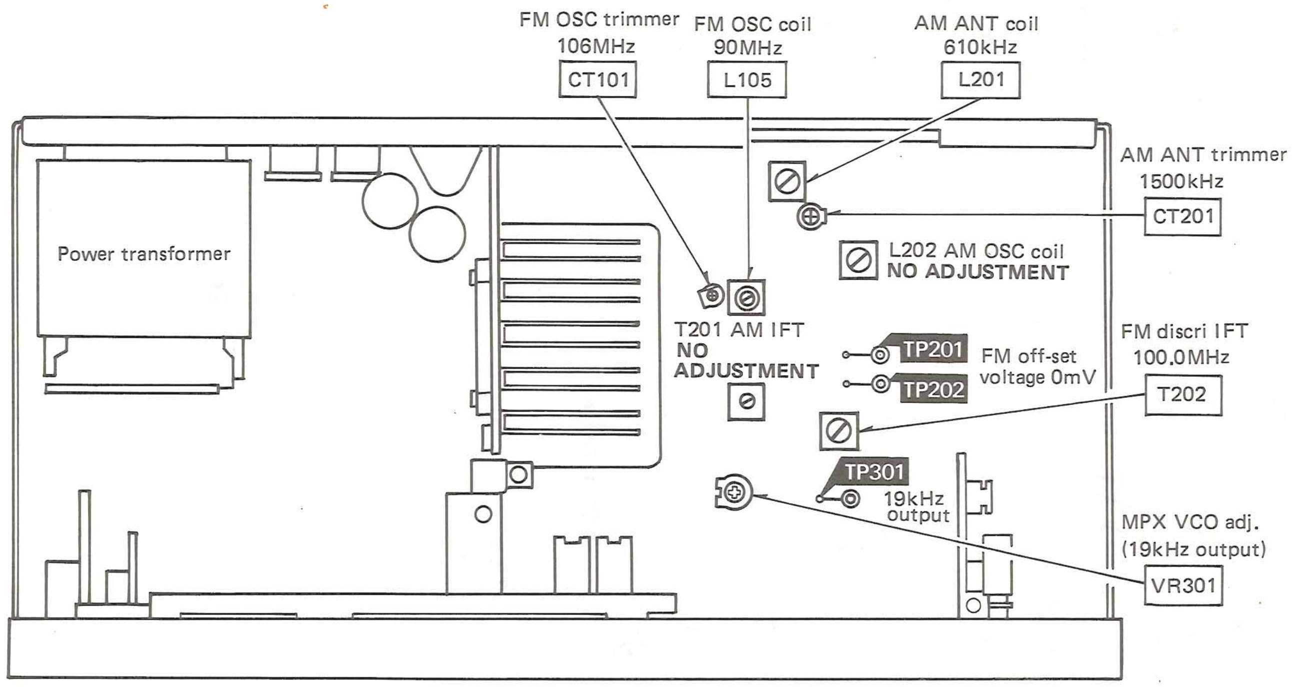
[Fig. 11]
FM MPX PILOT (VCO) adjustment


A
B
C
D
E
VR301

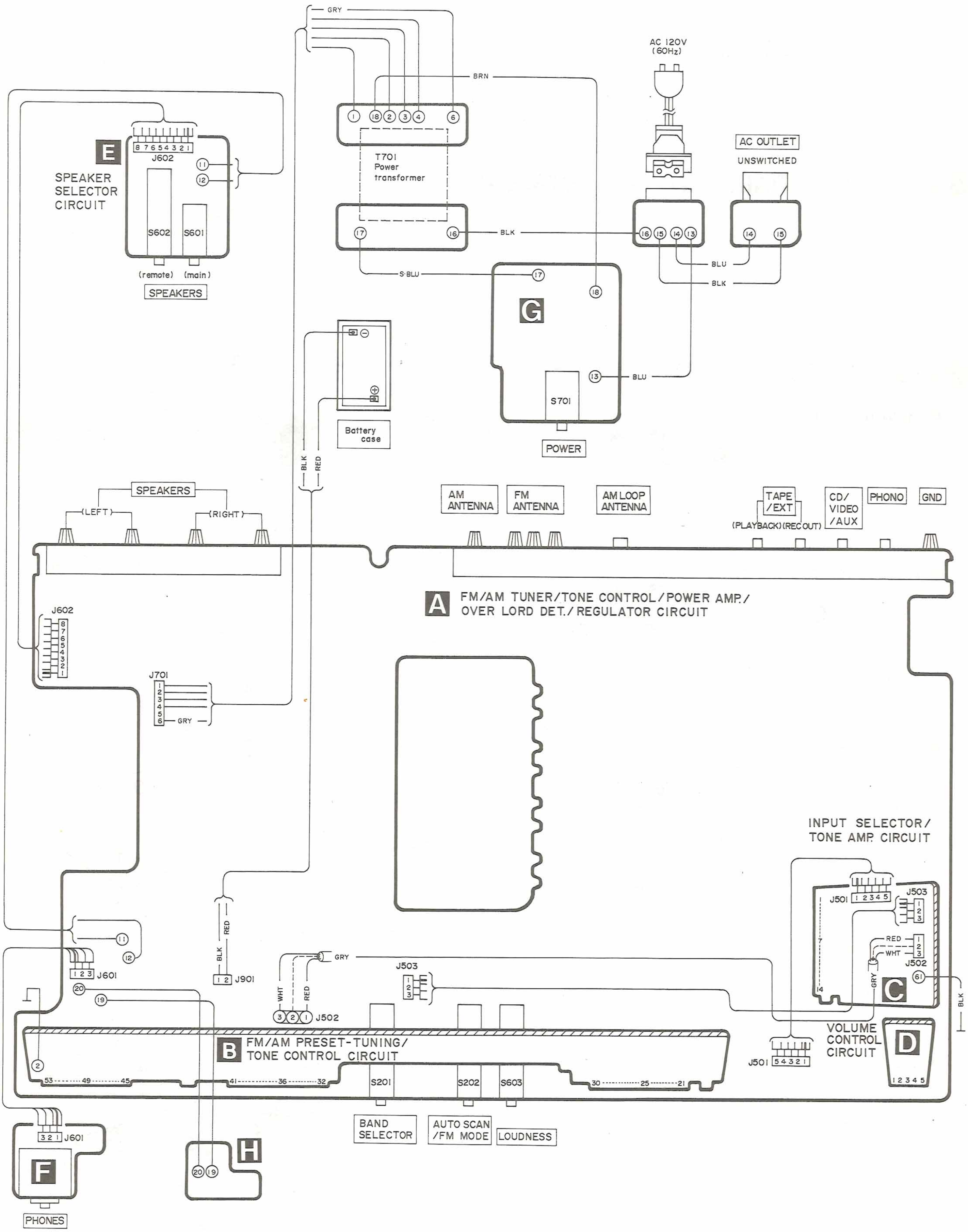
A–B, D–E Stereo OFF Position.
B–D Stereo ON Position. (indicator Lighting)
C Adjust Point of Pilot Circuit.

[Fig. 12]

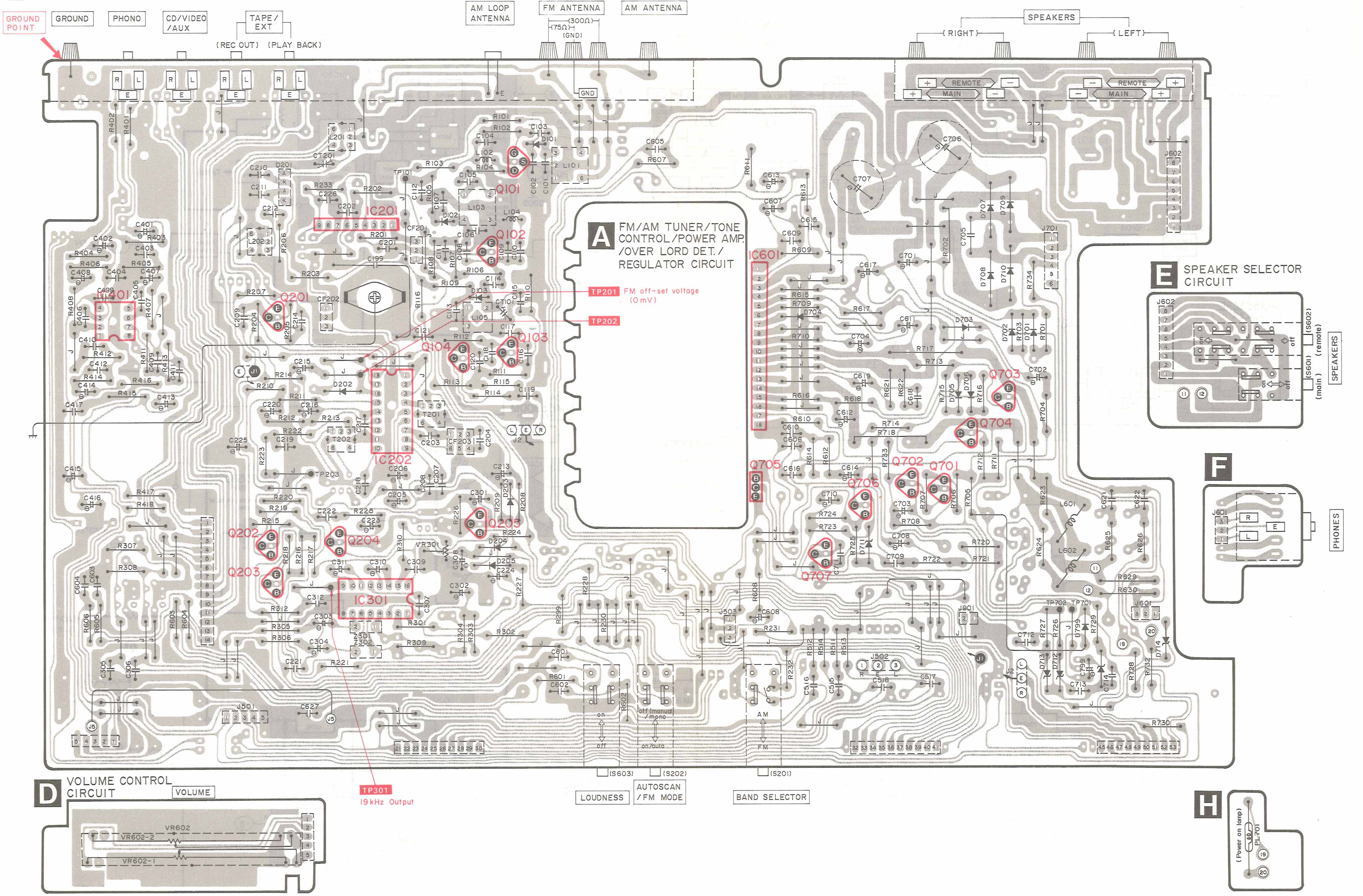
- **Adjustment points**


FM OSC trimmer 106MHz
CT101
FM OSC coil 90MHz
L105
AM ANT coil 610kHz
L201
AM ANT trimmer 1500kHz
CT201
Power transformer
L202 AM OSC coil NO ADJUSTMENT
T201 AM IFT NO ADJUSTMENT
TP201
TP202
FM off-set voltage 0mV
FM discri IFT 100.0MHz
T202
TP301
19kHz output
MPX VCO adj. (19kHz output)
VR301

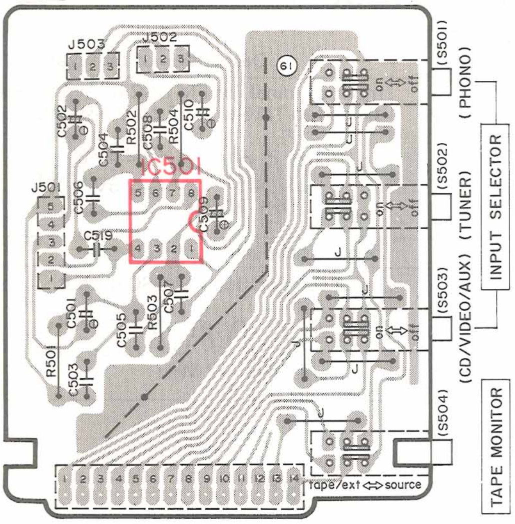
WIRING CONNECTION DIAGRAM (Top View)


GRY
BRN
AC 120V (60Hz)
T701 Power transformer
AC OUTLET
UNSWITCHED
BLK
S-BLU
BLU
BLK
E
SPEAKER SELECTOR CIRCUIT
J602
S602
S601
(remote)
(main)
SPEAKERS
G
S701
POWER
Battery case
BLK
RED
BLU
SPEAKERS
(LEFT)
(RIGHT)
AM ANTENNA
FM ANTENNA
AM LOOP ANTENNA
TAPE /EXT
(PLAYBACK)(REC OUT)
CD/ VIDEO /AUX
PHONO
GND
A
FM/AM TUNER/TONE CONTROL/POWER AMP./ OVER LORD DET./REGULATOR CIRCUIT
J602
J701
GRY
INPUT SELECTOR/ TONE AMP. CIRCUIT
J501
J503
RED
WHT
J502
GRY
C
BLK
J601
J901
RED
BLK
WHT
RED
GRY
J503
J502
VOLUME CONTROL CIRCUIT
D
J501
B
FM/AM PRESET-TUNING/ TONE CONTROL CIRCUIT
S201
S202
S603
BAND SELECTOR
AUTO SCAN /FM MODE
LOUDNESS
J601
F
PHONES
H

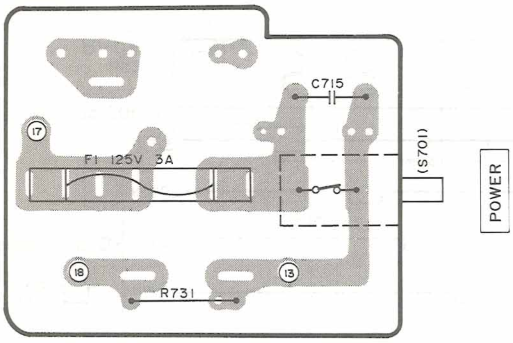
PRINTED CIRCUIT BOARDS


GROUND POINT
GROUND
PHONO
CD/VIDEO /AUX
TAPE/ EXT
(REC OUT)
(PLAY BACK)
AM LOOP ANTENNA
FM ANTENNA
(75Ω)
(300Ω)
(GND)
AM ANTENNA
SPEAKERS
RIGHT
LEFT
REMOTE
MAIN
A
FM/AM TUNER/TONE CONTROL/POWER AMP. /OVER LORD DET./ REGULATOR CIRCUIT
TP201
FM off-set voltage (0mV)
TP202
TP301
19kHz Output
IC201
IC202
IC301
IC401
IC601
Q101
Q102
Q103
Q104
Q201
Q202
Q203
Q204
Q205
Q701
Q702
Q703
Q704
Q705
Q706
Q707
LOUDNESS
(S603)
on
off
AUTOSCAN /FM MODE
(S202)
off (manual /mono
on/auto
BAND SELECTOR
(S201)
AM
FM
D
VOLUME CONTROL CIRCUIT
VOLUME
VR602
VR602-2
VR602-1
E
SPEAKER SELECTOR CIRCUIT
J602
(S602)
(remote)
(S601)
(main)
SPEAKERS
F
J601
PHONES
H
(Power on lamp)
PL701

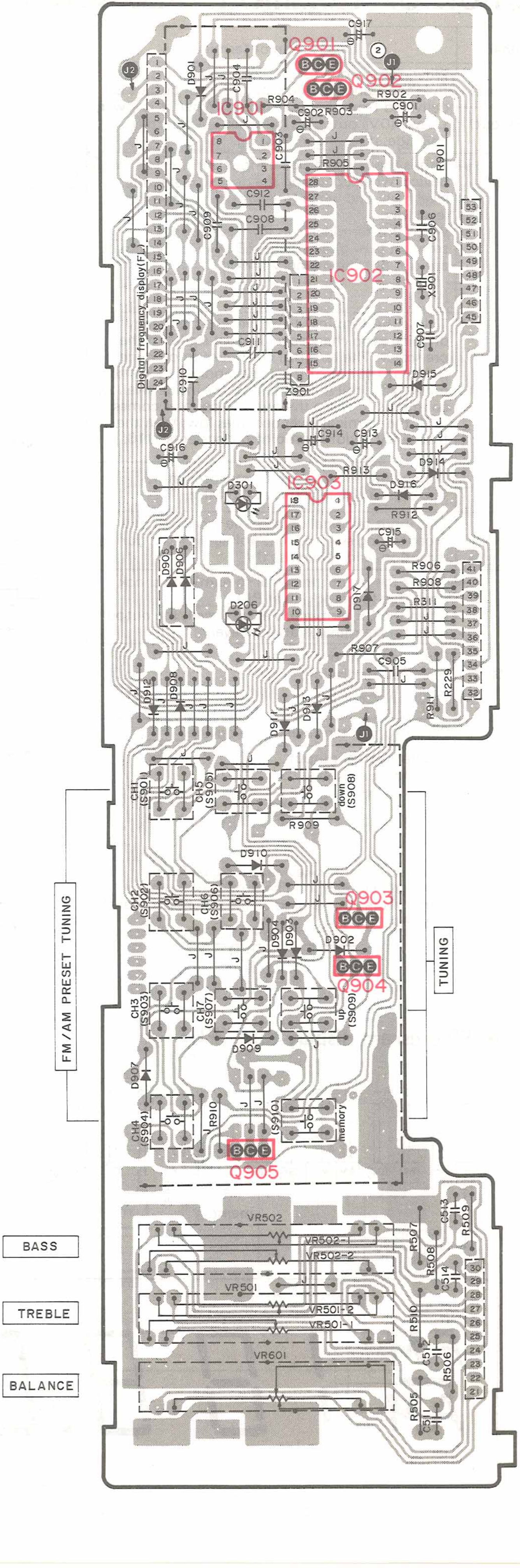
C INPUT SELECTOR/ TONE AMP. CIRCUIT


J503
J502
J501
C502
C504
R502
C508
R504
C510
IC501
C506
C509
C519
C501
C505
R503
C507
R501
C503
(S501)
(PHONO)
(S502)
(TUNER)
INPUT SELECTOR
(S503)
(CD/VIDEO/AUX)
(S504)
TAPE MONITOR
tape/ext ⇔ source
on
off

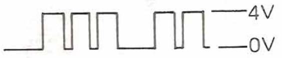
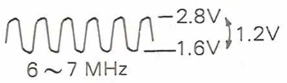
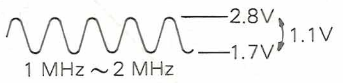
G


C715
F1 125V 3A
(S701)
POWER
R731

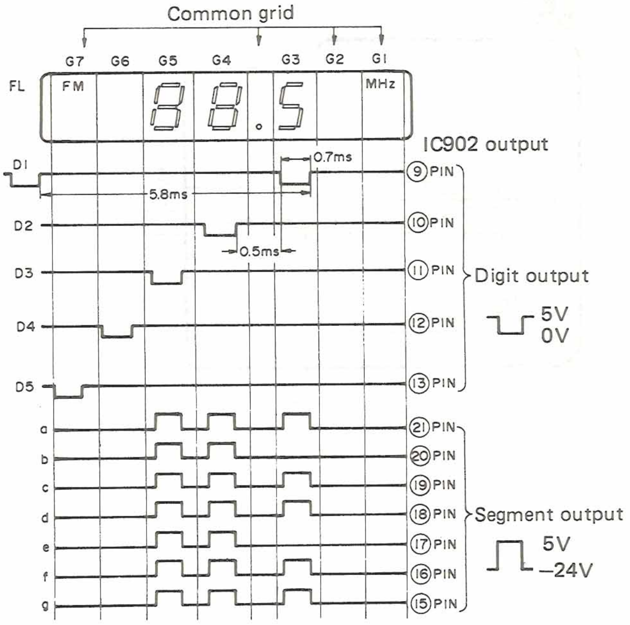
B FM/AM PRESET-TUNING/ TONE CONTROL CIRCUIT


C917
Q901
Q902
J2
J1
D901
C904
IC901
R904
R902
C902
R903
C901
C903
R905
R901
IC902
C906
X901
C907
Digital frequency display(FL)
C909
C912
C908
C911
C910
Z901
D915
C914
C913
C916
D914
R913
D301
IC903
D916
R912
C915
D905
D906
R906
R908
R311
D917
D206
R907
C905
R229
R911
D912
D908
D913
D911
CH1 (S901)
CH5 (S905)
down (S908)
R909
D910
CH2 (S902)
CH6 (S906)
Q903
D904
D903
D902
Q904
CH3 (S903)
CH7 (S907)
up (S909)
D909
D907
CH4 (S904)
R910
(S910)
memory
Q905
FM/AM PRESET TUNING
TUNING
VR502
VR502-1
VR502-2
VR501
VR501-2
VR501-1
VR601
C513
R509
R507
R508
C514
R510
C512
R506
R505
C511
BASS
TREBLE
BALANCE

FUNCTION OF TERMINAL (PLL CONTROLLER IC902)

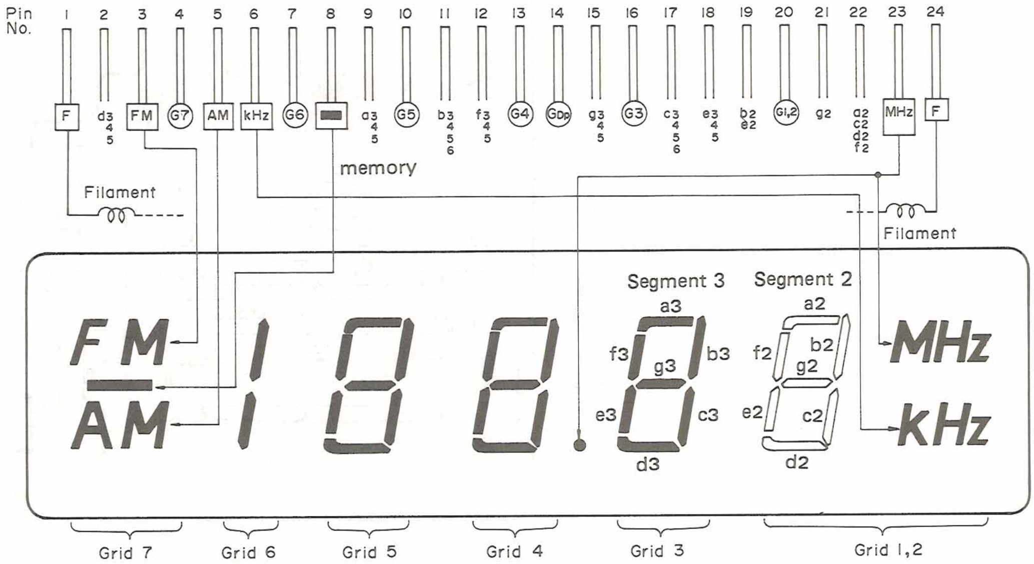
Terminal No.	Terminal	Description of terminal
1	E01 (Error out)	When the divided oscillation frequency is higher than the standard frequency, H-level output is delivered from these terminals. When it is lower, L-level (0V) output is delivered. When they coincide, it results in floating.
2	E02 (Error out)	
3	CE (Chip Enable)	This is the selected signal input terminal of the device. When operating the device, make the level high, and when it is not used, make the level low. When this terminal is at low level, all the segment (a ~ g) and digits (D1 ~ D5) terminals are off, but the memory is held.
4	PSC (Prescaler Control)	This is the terminal to deliver the frequency dividing ratio changeover output signal to the pre-scaler. The terminal continues to produce pulses at the rise of the signal applied to FM terminal (26) until the content of the inside swallow counter is 0. When the swallow counter comes to 0, the terminal level becomes low, then the frequency dividing ratio of pre-scaler is 1/16.
5	X1 (Crystal)	Connecting terminal for crystal oscillator. The crystal connected is at 4.5 MHz.
6	X2 (Crystal)	
7	SD (Station Detector)	This input terminal detects the reception of a broadcasting station. The voltage is 4.2V during reception, and otherwise 0V.
8	MUT (Muting)	This is the output terminal to eliminate shock noise due to unlocking at PLL. When the CE terminal is at low level, the output from this terminal is at high level.
9 ~ 13	D1 (Digit ~ Outputs) D5	Digit signal output terminal for display. (Refer to Fig. 19)
14	VDD	Power supply terminal of the device.
15 ~ 21	a ~ g (Segment Outputs)	Segment signal output terminal for display. (Refer to Fig. 13)
22 ~ 25	K3 (Key Return ~ Signal Inputs) K0	Input terminal for key return signal from external key matrix. The output of segment terminals (a ~ g) is used as the key return signal source. 
26	FM (Pulse swallow oscillation input)	Input terminal for FM OSC output frequency-divided to 1/16 or 1/17 by pre-scaler.  2.8V 1.6V 1.2V 6 ~ 7 MHz
27	E (Ground)	Ground terminal
28	AM (Direct oscillation input)	Input terminal for AM OSC output.  2.8V 1.7V 1.1V 1 MHz ~ 2 MHz

Digits and segment output voltage of IC902 (PLL controller)

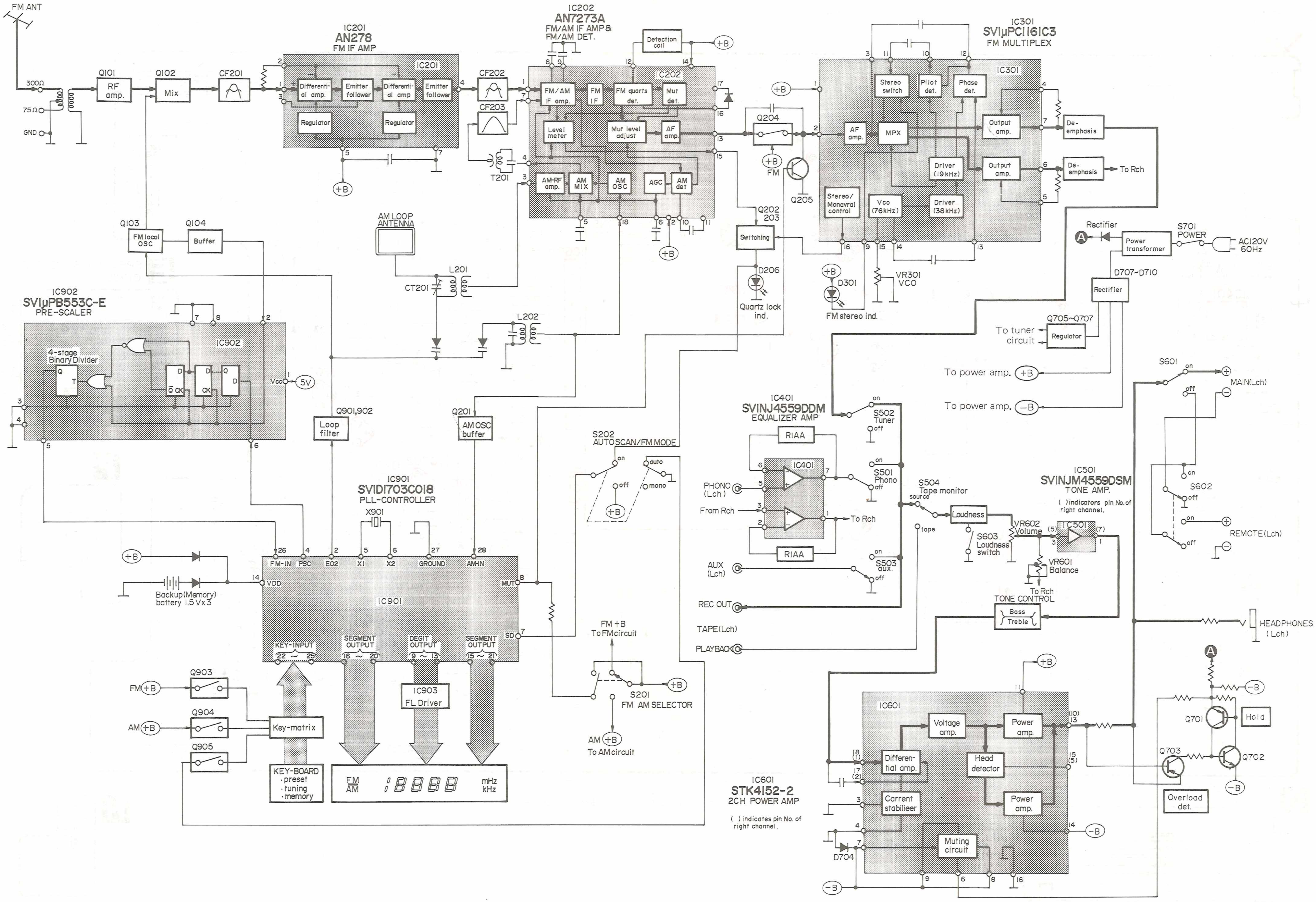

Common grid
G7
G6
G5
G4
G3
G2
G1
FL
FM
MHz
IC902 output
0.7ms
5.8ms
0.5ms
D1
D2
D3
D4
D5
⑨PIN
⑩PIN
⑪PIN
⑫PIN
⑬PIN
Digit output
5V
0V
a
b
c
d
e
f
g
㉑PIN
⑳PIN
⑲PIN
⑱PIN
⑰PIN
⑯PIN
⑮PIN
Segment output
5V
−24V

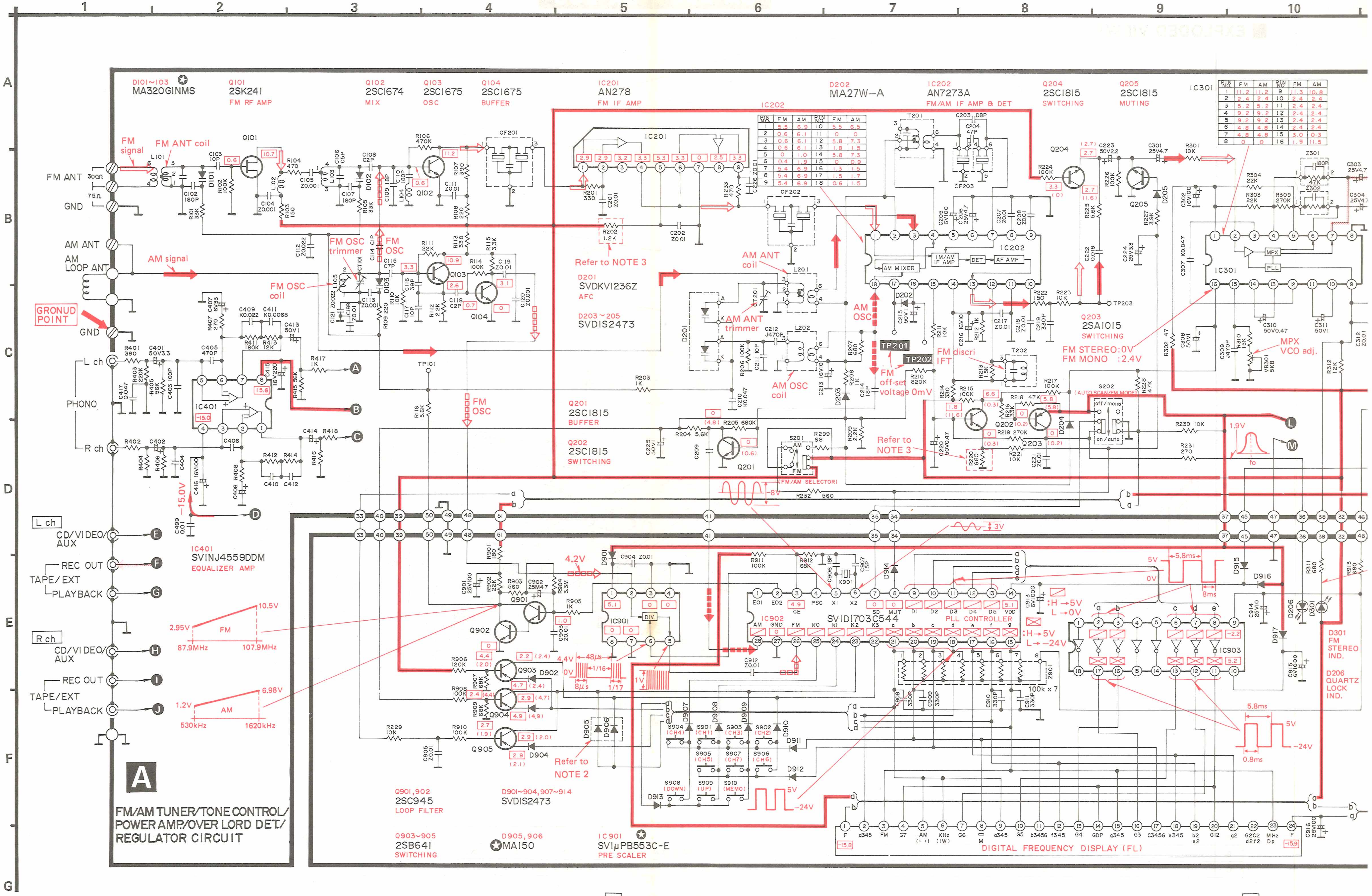
[Fig. 13]

- **Fluorescent display tube (FL)**


Pin No.
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
F
d3 4 5
FM
G7
AM
kHz
G6
d3 4 5
G5
b3 4 5 6
f3 4 5
G4
GDp
g3 4 5
G3
c3 4 5 6
e3 4 5
b2 e2
G1,2
g2
a2 c2 d2 f2
MHz
F
memory
Filament
Filament
Segment 3
Segment 2
a3
f3
b3
g3
e3
c3
d3
a2
f2
b2
g2
e2
c2
d2
FM
AM
MHz
kHz
Grid 7
Grid 6
Grid 5
Grid 4
Grid 3
Grid 1,2

BLOCK DIAGRAM


FM ANT
300Ω
75Ω
GND
Q101
RF amp.
Q102
Mix
CF201
IC201
AN278
FM IF AMP
IC201
Differenti-al amp.
Emitter follower
Differenti-al amp
Emitter follower
Regulator
Regulator
CF202
CF203
T201
+B
IC202
AN7273A
FM/AM IF AMP&
FM/AM DET.
Detection coil
+B
IC202
FM/AM IF amp.
FM IF
FM quarts det.
Mut det.
Level meter
Mut level adjust
AF amp.
AM-RF amp.
AM MIX
AM OSC
AGC
AM det
+B
Q204
+B
FM
Q205
Q202
203
Switching
D206
Quartz lock ind.
IC301
SVIμPC1161C3
FM MULTIPLEX
IC301
Stereo switch
Pilot det.
Phase det.
AF amp.
MPX
Output amp.
Output amp.
De-emphasis
De-emphasis
To Rch
Driver (19kHz)
Driver (38kHz)
Vco (76kHz)
Stereo/ Monavral control
+B
D301
FM stereo ind.
VR301
VCO
Q103
FM local OSC
Q104
Buffer
AM LOOP ANTENNA
L201
CT201
L202
IC902
SVIμPB553C-E
PRE-SCALER
IC902
4-stage Binary Divider
Vcc
5V
Q901,902
Loop filter
Q201
AM OSC buffer
S202
AUTO SCAN/FM MODE
on
off
auto
mono
+B
IC901
SVID1703C018
PLL-CONTROLLER
X901
FM-IN
PSC
EO2
X1
X2
GROUND
AM-IN
VDD
MUT
SD
IC901
+B
Backup(Memory) battery 1.5V×3
KEY-INPUT 22 ~ 25
SEGMENT OUTPUT 16 ~ 20
DEGIT OUTPUT 9 ~ 13
SEGMENT OUTPUT 15 ~ 21
IC903
FL Driver
Q903
FM +B
Q904
AM +B
Q905
Key-matrix
KEY-BOARD
·preset
·tuning
·memory
FM
AM
:8888
mHz
kHz
FM +B
To FM circuit
S201
FM AM SELECTOR
AM +B
To AM circuit
Rectifier
A
Power transformer
S701
POWER
AC120V
60Hz
D707~D710
Rectifier
Q705~Q707
To tuner circuit
Regulator
To power amp. +B
To power amp. −B
IC401
SVINJ4559DDM
EQUALIZER AMP
RIAA
IC401
RIAA
PHONO (Lch)
From Rch
To Rch
AUX (Lch)
REC OUT
TAPE(Lch)
PLAYBACK
S502
Tuner
S501
Phono
S503
aux.
on
off
S504
Tape monitor
source
tape
Loudness
S603
Loudness switch
VR602
Volume
VR601
Balance
To Rch
IC501
SVINJM4559DSM
TONE AMP.
( )indicates pin No. of right channel.
IC501
TONE CONTROL
Bass
Treble
S601
MAIN(Lch)
S602
REMOTE(Lch)
HEADPHONES (Lch)
IC601
STK4152-2
2CH POWER AMP
( )indicates pin No. of right channel.
IC601
Voltage amp.
Power amp.
Differen-tial amp.
Head detector
Carrent stabilieer
Power amp.
Muting circuit
D704
−B
+B
−B
Q701
Hold
Q703
Q702
−B
Overload det.
A


1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F
G
D101~103 ✪
MA320GINMS
Q101
2SK241
FM RF AMP
Q102
2SC1674
MIX
Q103
2SC1675
OSC
Q104
2SC1675
BUFFER
IC201
AN278
FM IF AMP
IC202
D202
MA27W-A
IC202
AN7273A
FM/AM IF AMP & DET
Q204
2SC1815
SWITCHING
Q205
2SC1815
MUTING
IC301
FM ANT
FM signal
FM ANT coil
75Ω
300Ω
GND
AM ANT
AM LOOP ANT
AM signal
GRONUD POINT
GND
FM OSC trimmer
FM OSC
FM OSC coil
Refer to NOTE 3
D201
SVDKV1236Z
AFC
D203~205
SVDIS2473
AM ANT coil
AM ANT trimmer
AM OSC
AM OSC coil
TP201
TP202
FM discri
IFT
FM off-set voltage 0mV
Q203
2SA1015
SWITCHING
FM STEREO:0V
FM MONO :2.4V
MPX VCO adj.
Q201
2SC1815
BUFFER
Q202
2SC1815
SWITCHING
S201 (FM/AM SELECTOR)
S202 (AUTO SCAN/FM MODE)
off/mono
on/auto
Refer to NOTE 3
L ch
R ch
PHONO
IC401
SVINJ4559DDM
EQUALIZER AMP
-15.0V
L ch
CD/VIDEO/AUX
TAPE/EXT
REC OUT
PLAYBACK
R ch
CD/VIDEO/AUX
TAPE/EXT
REC OUT
PLAYBACK
4.2V
IC901
DIV
IC902
SVID1703C544
PLL CONTROLLER
X901
Q901
Q902
Q903
Q904
Q905
D902
D904
2.95V
10.5V
FM
87.9MHz
107.9MHz
1.2V
6.98V
AM
530kHz
1620kHz
4.4V
48μs
1/16
0V
8μs
1/17
1V
Refer to NOTE 2
S904 (CH4)
S901 (CH1)
S903 (CH3)
S902 (CH2)
S905 (CH5)
S907 (CH7)
S906 (CH6)
S908 (DOWN)
S909 (UP)
S910 (MEMO)
5V
-24V
5V
5.8ms
0V
8ms
:H→5V
L→0V
:H→5V
L→-24V
IC903
Z901
100k × 7
5.8ms
5V
-24V
0.8ms
D301 FM STEREO IND.
D206 QUARTZ LOCK IND.
DIGITAL FREQUENCY DISPLAY (FL)
Q901,902
2SC945
LOOP FILTER
D901~904,907~914
SVDIS2473
Q903~905
2SB641
SWITCHING
D905,906
✪MA150
IC901 ✪
SV1μPB553C-E
PRE SCALER
A

IC202

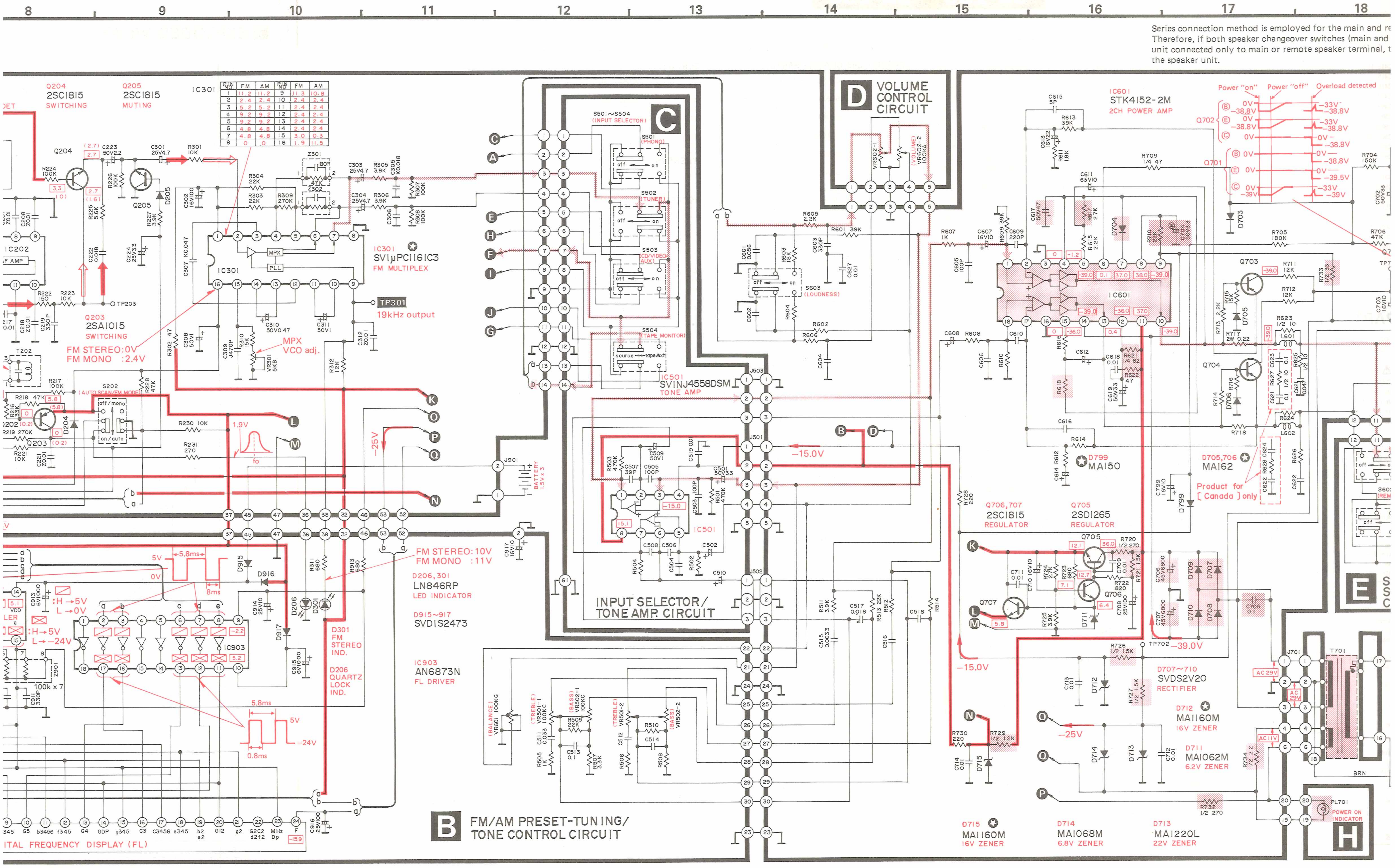
PIN NO.	FM	AM	PIN NO.	FM	AM
1	5.5	6.9	10	5.5	6.5
2	0.6	6.1	11	0	0
3	0.6	6.1	12	5.8	7.3
4	0.6	6.1	13	1.8	1.5
5	0	1.0	14	5.8	7.3
6	0.4	1.9	15	0	0.9
7	5.4	6.9	16	1.3	1.5
8	5.4	6.9	17	1.5	1.7
9	5.4	6.9	18	0.6	1.5

IC301

PIN NO.	FM	AM	PIN NO.	FM	AM
1	11.2	11.2	9	11.3	10.8
2	2.4	2.4	10	2.4	2.4
3	5.2	5.2	11	2.4	2.4
4	9.2	9.2	12	2.4	2.4
5	9.2	9.2	13	2.4	2.4
6	4.8	4.8	14	2.4	2.4
7	4.8	4.8	15	3.0	0.3
8	0	0	16	1.9	11.5

FM/AM TUNER/TONE CONTROL/POWER AMP./OVER LORD DET./REGULATOR CIRCUIT

Series connection method is employed for the main and re
Therefore, if both speaker changeover switches (main and
unit connected only to main or remote speaker terminal, t
the speaker unit.

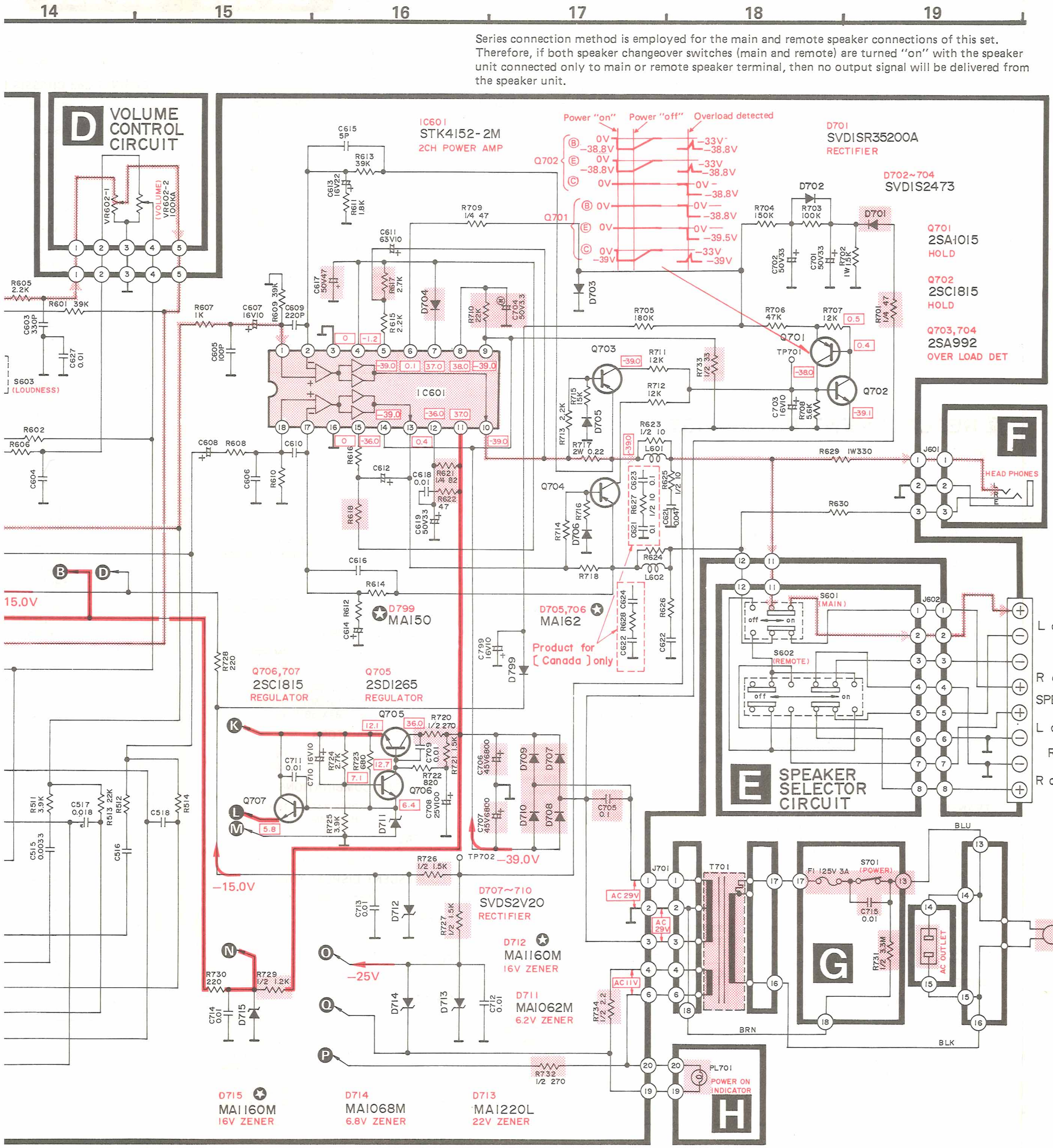


IC301

PIN NO.	FM	AM	PIN NO.	FM	AM
1	11.2	11.2	9	11.3	10.8
2	2.4	2.4	10	2.4	2.4
3	5.2	5.2	11	2.4	2.4
4	9.2	9.2	12	2.4	2.4
5	9.2	9.2	13	2.4	2.4
6	4.8	4.8	14	2.4	2.4
7	4.8	4.8	15	3.0	0.3
8	0	0	16	1.9	11.5

8
9
10
11
12
13
14
15
16
17
18
Q204
2SC1815
SWITCHING
Q205
2SC1815
MUTING
IC301
SV1μPC1161C3
FM MULTIPLEX
TP301
19kHz output
Q203
2SA1015
SWITCHING
FM STEREO:0V
FM MONO :2.4V
MPX
VCO adj.
S202
(AUTO SCAN/FM MODE)
IC202
C
S501~S504
(INPUT SELECTOR)
S501 (PHONO)
S502 (TUNER)
S503 (CD/VIDEO/AUX)
S504 (TAPE MONITOR)
source
tape/ext
IC501
SV1NJ4558DSM
TONE AMP
D
VOLUME
CONTROL
CIRCUIT
VR602-1
VR602-2
(VOLUME)
100KA
S603
(LOUDNESS)
IC601
STK4152-2M
2CH POWER AMP
Power "on"
Power "off"
Overload detected
Q702
Q701
J901
BATTERY
1.5V×3
-25V
-15.0V
1.9V
fo
FM STEREO:10V
FM MONO :11V
D206, 301
LN846RP
LED INDICATOR
D915~917
SVD1S2473
IC903
AN6873N
FL DRIVER
D301
FM
STEREO
IND.
D206
QUARTZ
LOCK
IND.
5.8ms
8ms
5V
0V
-24V
0.8ms
H→5V
L→0V
H→5V
L→-24V
100k×7
ITAL FREQUENCY DISPLAY (FL)
INPUT SELECTOR/
TONE AMP. CIRCUIT
(BALANCE)
VR601 100KG
(TREBLE)
VR501-1
100KC
(BASS)
VR502-1
100KC
(TREBLE)
VR501-2
(BASS)
VR502-2
B
FM/AM PRESET-TUNING/
TONE CONTROL CIRCUIT
D799
MA150
Q706,707
2SC1815
REGULATOR
Q705
2SD1265
REGULATOR
D705,706
MA162
Product for
[Canada] only
D707~710
SVDS2V20
RECTIFIER
D712
MA1160M
16V ZENER
D711
MA1062M
6.2V ZENER
TP702
-39.0V
D715
MA1160M
16V ZENER
D714
MA1068M
6.8V ZENER
D713
MA1220L
22V ZENER
J701
T701
BRN
AC 29V
AC 11V
PL701
POWER ON
INDICATOR
H
E

Series connection method is employed for the main and remote speaker connections of this set. Therefore, if both speaker changeover switches (main and remote) are turned "on" with the speaker unit connected only to main or remote speaker terminal, then no output signal will be delivered from the speaker unit.


14
15
16
17
18
19
D VOLUME CONTROL CIRCUIT
VR602-1
VR602-2 (VOLUME) 100KA
S603 (LOUDNESS)
IC601 STK4152-2M 2CH POWER AMP
IC601
Power "on"
Power "off"
Overload detected
Q702
Q701
D701 SVDISR35200A RECTIFIER
D702~704 SVDIS2473
Q701 2SA1015 HOLD
Q702 2SC1815 HOLD
Q703,704 2SA992 OVER LOAD DET
Q703
Q704
TP701
D702
D701
D703
D704
D705
D706
F
HEAD PHONES
J601
D799 MAI50
D705,706 MAI62
Product for [Canada] only
Q706,707 2SC1815 REGULATOR
Q705 2SD1265 REGULATOR
15.0V
−15.0V
−39.0V
−25V
TP702
S601 (MAIN)
S602 (REMOTE)
J602
L ch
MAIN
R ch
SPEAKERS
L ch
REMOTE
R ch
E SPEAKER SELECTOR CIRCUIT
D707~710 SVDS2V20 RECTIFIER
D712 MAI160M 16V ZENER
D711 MAI062M 6.2V ZENER
D715 MAI160M 16V ZENER
D714 MAI068M 6.8V ZENER
D713 MAI220L 22V ZENER
J701
T701
F1 125V 3A
S701 (POWER)
AC OUTLET
G
AC 120V (60Hz)
AC 29V
AC 11V
BLU
BRN
BLK
PL701 POWER ON INDICATOR
H
K
L
M
N
O
P
Q
B
D

SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

- **The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement parts, please use the part No. in the replacement parts list.**

NOTE 1

1. **S201** : Band selector switch in "**FM**" position.
   (▮ FM, ▬ AM)
2. **S202** : Auto scan/FM mode selector switch in "**on/auto**" position.
   (▮ on/auto, ▬ off (manual)/mono)
3. **S501 ~ S503** : Input selectors switch in "**tuner**" position.
   (**S501**: phono, **S502**: tuner, **S503**: CD/video/aux)
4. **S504** : Tape monitor selector switch in "**source**" position.
   (▮ source, ▬ tape/ext)
5. **S601** : Speaker selector (main) switch in "**on**" position.
   (▮ off, ▬ on)
6. **S602** : Speaker selector (remote) switch in "**off**" position.
   (▮ off, ▬ on)
7. **S603** : Loudness switch in "**off**" position.
   (▮ off, ▬ on)
8. **S701** : Power switch in "**on**" position.
   (▮ off, ▬ on)
9. **S901 ~ S907** : Preset-tuning switch.
   S901: FM/AM−1CH, **S902**: FM/AM−2CH, **S903**: FM/AM−3CH, **S904**: FM/AM−4CH,
   S905: FM/AM−5CH, **S906**: FM/AM−6CH, **S907**: FM/AM−7CH
10. **S908, 909** : Tuning switch.
    (**S908** − down, **S909** − up)
11. **S910** : Memory switch.
    (manual ↔ auto)
12. Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard.
    Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
    * Figures in ☐ stand for DC voltage in FM signal (monaural) reception mode.
    * Figures in ⌜ ⌟ stand for DC voltage in FM stereo signal reception mode.
    * Figures in ( ) stand for DC voltage in AM signal reception mode.
13. ▬ Positive (+B) voltage lines
    ⇢ AF signal lines
    ⇨ FM signal
    ➡ AM signal
    → Negative (−B) voltage lines
    □□□□⇨ FM OSC
    ■■■■➡ AM OSC

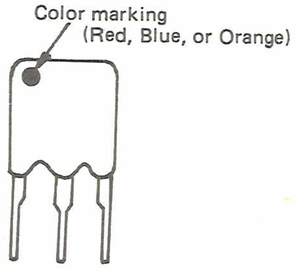
IMPORTANT SAFETY NOTICE

The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards.
When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

NOTE 2

● Use of ceramic filters in pairs

The ceramic filters (CF201, CF202) for FM-IF circuit are available in two ranks. For this machine, be sure to use the ceramics of the same rank in a pair.
At repairing and replacement, pay close attention to the diodes (D905, D906) for use as different diodes must be used depending on each rank of the ceramic filters.


Color marking
(Red, Blue, or Orange)

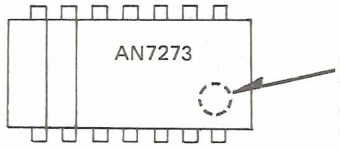
RANK (Color)	D905	D906	CENTER FREQUENCY
Red	X	X	10.70 MHz
Orange	X	○	10. 73 MHz
Blue	○	○	10.67 MHz

Notes: ○ Mark Diode is used.
X Mark Diode is not used.

NOTE 3

AN7273 (IC202) is available in A rank (AN7273A) and B rank (AN7273B). Either rank can be used for this unit, but the suitable resistor must be used according to the rank as shown in the table below. So, keep this point in mind when repairing or replacing the unit.

RANK / Ref.No.	A	B
R202	1.2kΩ	820Ω
R220	680Ω	560Ω



"A" painted in this position or red mark on main body stands for A rank, and similarly, "B" or green mark stands for B rank.

RESISTORS & CAPACITORS

Notes:

1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. The unit of resistance is Ω(ohm), K = 1000Ω, M = 1000kΩ.
5. The unit of capacitance is μF (microfarad). P = 10^{-6} μF
6. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Resistor Type	Wattage	Tolerance
ERD : Carbon	25 : 1/4W	J : ± 5%
ERG : Metal Oxide	1 : 1W	K : ±10%
ERX : Metal Film	2 : 2W	
ERC : Solid	S1 : 1/2W	
	12 : 1/2W	

Capacitor Type	Voltage		Tolerance
	ECEA Type	Other	
ECEA : Electrolytic	0J : 6.3V	1H : 50V	C : ±0.25pF
ECCD : Ceramic	1A : 10V	KC : 400V AC	J : ±5%
ECKD : Ceramic	1C : 16V		K : ±10%
ECQM : Polyester	1E : 25V		Z : +80%, −20%
ECET : Electrolytic	1H : 50V		P : +100%, −0%
ECEA. . .N : Non Polar Electrolytic	25 : 25V		
ECQP : Polypropylene	45 : 45V		
ECBT : Electrolytic	1J : 63V		

● RESISTORS

Ref. No.	Part No.	Value
R101 Ⓢ	ERD25TJ333	33K
R102 Ⓢ	ERD25TJ104	100K
R103 Ⓢ	ERD25FJ151	150
R104 Ⓢ	ERD25FJ471	470
R105 Ⓢ	ERD25TJ333	33K
R106 Ⓢ	ERD25TJ474	470K
R107 Ⓢ	ERD25FJ391	390
R108,109 Ⓢ	ERD25FJ221	220
R110 Ⓢ	ERD25FJ103	10K
R111 Ⓢ	ERD25TJ223	22K
R112 Ⓢ	ERD25FJ222	2.2K
R113 Ⓢ	ERD25FJ331	330
R114 Ⓢ	ERD25TJ104	100K
R115 Ⓢ	ERD25FJ332	3.3K
R116 Ⓢ	ERD25FJ562	5.6K
R201 Ⓢ	ERD25FJ331	330
R202 Ⓢ	ERD25FJ122	1.2K
R203 Ⓢ	ERD25FJ102	1K
R204 Ⓢ	ERD25FJ562	5.6K
R205 Ⓢ	ERD25TJ684	680K
R206 Ⓢ	ERD25TJ104	100K
R207 Ⓢ	ERD25FJ681	680
R208 Ⓢ	ERD25FJ102	1K
R209 Ⓢ	ERD25FJ222	2.2K
R210 Ⓢ	ERD25TJ824	820K
R211 Ⓢ	ERD25FJ103	10K
R212 Ⓢ	ERD25FJ102	1K
R213 Ⓢ	ERD25FJ152	1.5K
R214 Ⓢ	ERD25FJ331	330
R215 Ⓢ	ERD25TJ104	100K
R216 Ⓢ	ERD25TJ333	33K
R217 Ⓢ	ERD25TJ104	100K
R218 Ⓢ	ERD25TJ473	47K
R219 Ⓢ	ERD25TJ274	270K
R220 Ⓢ	ERD25FJ681	680
R221 Ⓢ	ERD25FJ103	10K
R222 Ⓢ	ERD25FJ151	150
R223 Ⓢ	ERD25FJ103	10K
R224 Ⓢ	ERD25TJ104	100K
R225 Ⓢ	ERD25FJ562	5.6K
R226 Ⓢ	ERD25TJ104	100K
R227 Ⓢ	ERD25FJ392	3.9K
R228 Ⓢ	ERD25TJ473	47K
R229,230 Ⓢ	ERD25FJ103	10K
R231 Ⓢ	ERD25FJ271	270
R232 Ⓢ	ERD25FJ561	560
R233 Ⓢ	ERD25FJ471	470
R299 Ⓢ	ERD25FJ680	68
R301 Ⓢ	ERD25FJ103	10K
R302 Ⓢ	ERD25FJ470	47
R303,304 Ⓢ	ERD25TJ223	22K
R305,306 Ⓢ	ERD25FJ392	3.9K
R307,308 Ⓢ	ERD25TJ104	100K
R309 Ⓢ	ERD25TJ274	270K
R310 Ⓢ	ERD25TJ153	15K
R311 Ⓢ	ERD25FJ681	680
R312 Ⓢ	ERD25TJ123	12K
R401,402 Ⓢ	ERD25FJ391	390
R403,404 Ⓢ	ERD25TJ224	220K
R405,406 Ⓢ	ERD25TJ563	56K
R407,408 Ⓢ	ERD25FJ271	270
R411,412 Ⓢ	ERD25TJ184	180K
R413,414 Ⓢ	ERD25TJ123	12K
R415,416 Ⓢ	ERD25TJ563	56K
R417,418 Ⓢ	ERD25FJ102	1K
R501,502 Ⓢ	ERD25TJ474	470K
R503,504 Ⓢ	ERD25TJ474	470K
R505,506 Ⓢ	ERD25FJ102	1K
R507,508 Ⓢ	ERD25FJ332	3.3K
R509,510 Ⓢ	ERD25TJ223	22K
R511,512 Ⓢ	ERD25FJ392	3.9K
R513,514 Ⓢ	ERD25TJ223	22K
R601,602 Ⓢ	ERD25TJ393	39K
R603,604 Ⓢ	ERD25TJ183	18K
R605,606 Ⓢ	ERD25FJ222	2.2K
R607,608 Ⓢ	ERD25FJ102	1K
R609,610 Ⓢ	ERD25TJ393	39K
R611,612 Ⓢ	ERD25FJ182	1.8K
R613.614 Ⓢ	ERD25TJ393	39K
R615,616 Ⓢ	ERD25FJ222	2.2K
R617,618 Ⓢ ⚠	ERD25FJ272	2.7K
R621 Ⓢ ⚠	ERD25FJ820	82
R622 Ⓢ ⚠	ERD25FJ470	47
R623,624 ⚠	ERDS1FJ100	10
R625,626 〔M〕only	ERDS1FJ100	10
R627,628 〔MC〕only	ERDS1FJ100	10
R629,630 Ⓢ	ERG1ANJ331	330
R701 Ⓢ ⚠	ERD25FJ470	47
R702 Ⓢ	ERG1ANJ152	1.5K
R703 Ⓢ	ERD25TJ104	100K
R704 Ⓢ	ERD25TJ154	150K
R705 Ⓢ	ERD25TJ184	180K
R706 Ⓢ	ERD25TJ473	47K
R707 Ⓢ	ERD25TJ123	12K
R708 Ⓢ	ERD25FJ562	5.6K
R709 Ⓢ ⚠	ERD25FJ470	47
R710 Ⓢ ⚠	ERD25TJ223	22K
R711,712 Ⓢ	ERD25TJ123	12K
R713,714 Ⓢ	ERD25FJ222	2.2K
R715,716 Ⓢ	ERD25TJ153	15K
R717,718 Ⓢ	ERX2ANJR22	0.22
R720 ⚠	ERDS1FJ270	27
R721 ⚠	ERDS1FJ152	1.5K
R722 Ⓢ	ERD25FJ821	820
R723 Ⓢ	ERD25FJ681	680
R724 Ⓢ	ERD25FJ272	2.7K
R725 Ⓢ	ERD25FJ392	3.9K
R726,727 ⚠	ERDS1FJ152	1.5K
R728 Ⓢ	ERD25FJ221	220
R729 ⚠	ERDS1FJ122	1.2K
R730 Ⓢ	ERD25FJ221	220
R731 Ⓢ ⚠	ERC12ZGK335	3.3M
R732 ⚠	ERDS1FJ271	270
R733 ⚠	ERDS1FJ330	33
R734 ⚠	ERDS1FJ2R2	2.2
R901 Ⓢ	ERD25FJ181	180
R902 Ⓢ	ERD25TJ223	22K
R903 Ⓢ	ERD25FJ561	560
R904 Ⓢ	ERC14GK335	3.3M
R905 Ⓢ	ERD25FJ102	1K
R906 Ⓢ	ERD25TJ124	120K
R907 Ⓢ	ERD25TJ683	68K
R908 Ⓢ	ERD25TJ104	100K
R909 Ⓢ	ERD25TJ683	68K
R910,911 Ⓢ	ERD25TJ104	100K
R912 Ⓢ	ERD25TJ683	68K
R913 Ⓢ	ERD25FJ681	680

● CAPACITORS

Ref. No.	Part No.	Value
C101 Ⓢ	ECCD1H040CC	4P
C102 Ⓢ	ECCD1H181K	180P
C103 Ⓢ	ECCD1H100KC	10P
C104,105 Ⓢ	ECKD1H102ZF	0.001
C106 Ⓢ	ECCD1H050CC	5P
C107 Ⓢ	ECCD1H181K	180P
C108 Ⓢ	ECCD1H020CC	2P
C109 Ⓢ	ECCD1H180KC	18P
C110 Ⓢ	ECCD1H181K	180P
C111 Ⓢ	ECKD1H103ZF	0.01
C112 Ⓢ	ECKD1H223ZF	0.022
C113 Ⓢ	ECKD1H102ZF	0.001
C114 Ⓢ	ECCD1H010CC	1P
C115 Ⓢ	ECCD1H070CC	7P
C116 Ⓢ	ECCD1H390KC	39P
C117 Ⓢ	ECCD1H100KC	10P
C118 Ⓢ	ECCD1H020CC	2P
C119 Ⓢ	ECKD1H103ZF	0.01
C120 Ⓢ	ECKD1H102ZF	0.001
C121 Ⓢ	ECKD1H223ZF	0.022
C199 Ⓢ	ECKD1H103ZF	0.01
C201,202 Ⓢ	ECKD1H103ZF	0.01
C203 Ⓢ	ECCD1H080CC	8P
C204 Ⓢ	ECCD1H470K	47P
C205	ECEA0JU101	100
C206	ECEA1EU4R7	4.7
C207,208 Ⓢ	ECKD1H103ZF	0.01
C209 Ⓢ	ECKD1H103ZF	0.01
C210	ECQM1H473KV	0.047
C211 Ⓢ	ECCD1H100KC	10P
C212	ECQP1471JZ	470P
C213	ECEA1CU100	10
C214 Ⓢ	ECCD1H180K	18P
C215	ECEA1HU010	1
C216	ECEA1CU100	10
C217,218 Ⓢ	ECKD1H103ZF	0.01
C219 Ⓢ	ECKD1H331KB	330P
C220	ECEA1HUR47	0.47
C221 Ⓢ	ECKD1H103ZF	0.01
C222	ECQM1H183KV	0.018

Ref. No.	Part No.	Value
C223	ECEA1HU2R2	2.2
C224	ECEA1EU3R3	3.3
C225	ECEA1HU010	1
C226 Ⓢ	ECKD1H103ZF	0.01
C301	ECEA1EU4R7	4.7
C302	ECEA1CU101	100
C303,304	ECEA1EU4R7	4.7
C305,306	ECQM1H183KV	0.018
C307	ECQM1H473KV	0.047
C308	ECEA1HU010	1
C309	ECQP1471JZ	470P
C310	ECEA1HUR47	0.47
C311	ECEA1HU010	1
C312 Ⓢ	ECKD1H103ZF	0.01
C401,402	ECEA1HU3R3	3.3
C403,404 Ⓢ	ECCD1H101K	100P
C405,406 Ⓢ	ECKD1H471KB	470P
C407,408	ECEA0JU330	33
C409,410	ECQM1H223KV	0.022
C411,412	ECQM1H682KV	0.0068
C413,414	ECEA1HU010	1
C415	ECEA1CU221	220
C416	ECEA1CU101	100
C417 Ⓢ	ECKD1H473ZF	0.047
C499 Ⓢ	ECKD1H103ZF	0.01
C501,502	ECEA1HU3R3	3.3
C503,504 Ⓢ	ECCD1H101K	100P
C505,506 Ⓢ	ECCD1H101K	100P
C507,508 Ⓢ	ECCD1H390K	39P
C509,510	ECEA1HU010	1
C511,512	ECQM1H333KV	0.033
C513,514	ECQM1H104KV	0.1
C515,516	ECQM1H332KV	0.0033
C517,518	ECQM1H183KV	0.018
C519 Ⓢ	ECKD1H103ZF	0.01
C601,602	ECQM1H563KV	0.056
C603,604 Ⓢ	ECKD1H331KB	330P
C605,606 Ⓢ	ECCD1H101K	100P
C607,608	ECEA1CU100	10
C609,610 Ⓢ	ECKD1H221KB	220P
C611,612	ECEA1JU100	10
C613,614	ECEA1CU220	22
C615,616 Ⓢ	ECCD1H050CC	5P
C617 ⚠	ECEA1HU470	47
C618 Ⓢ	ECKD1H103ZF	0.01
C619	ECEA1HU330	33
C621,622 Ⓢ 〔M〕only	ECKD1H473ZF	0.047
C621,622 〔MC〕only	ECQM1H104KV	0.1
C623,624 〔MC〕only	ECQM1H104KV	0.1
C627 Ⓢ	ECKD1H103ZF	0.01
C701,702	ECEA1HU330	33
C703	ECEA1CU100	10
C704 ⚠	ECEA1HN3R3S	3.3
C705 ⚠	EDQE1104KN	0.1
C706,707 ⚠	ECETS45V682U	6800
C708	ECEA1EU101	100
C709 Ⓢ	ECKD1H103ZF	0.01
C710	ECEA1CU100	10
C711,712 Ⓢ	ECKD1H103ZF	0.01
C713,714 Ⓢ	ECKD1H103ZF	0.01
C715 ⚠	ECKDKC103PF	0.01
C799	ECEA1CU100	10
C901	ECEA1EU101	100
C902 Ⓢ	ECEA25M4R7R	4.7
C903,904	ECBT1C103ZYY	0.01
C905	ECBT1C103ZYY	0.01
C906 Ⓢ	ECCD1H180KC	18P
C907 Ⓢ	ECCD1H150KC	15P
C908,909	ECBT1H331KBY	330P
C910,911	ECBT1H331KBY	330P
C912	ECBT1H103ZYY	0.01
C913	ECEA0JU102	1000
C914	ECEA1EU100	10
C915	ECEA0JU102	1000
C916	ECEA1EU101	100
C917	ECEA1CU100	10

REPLACEMENT PARTS LIST

Notes

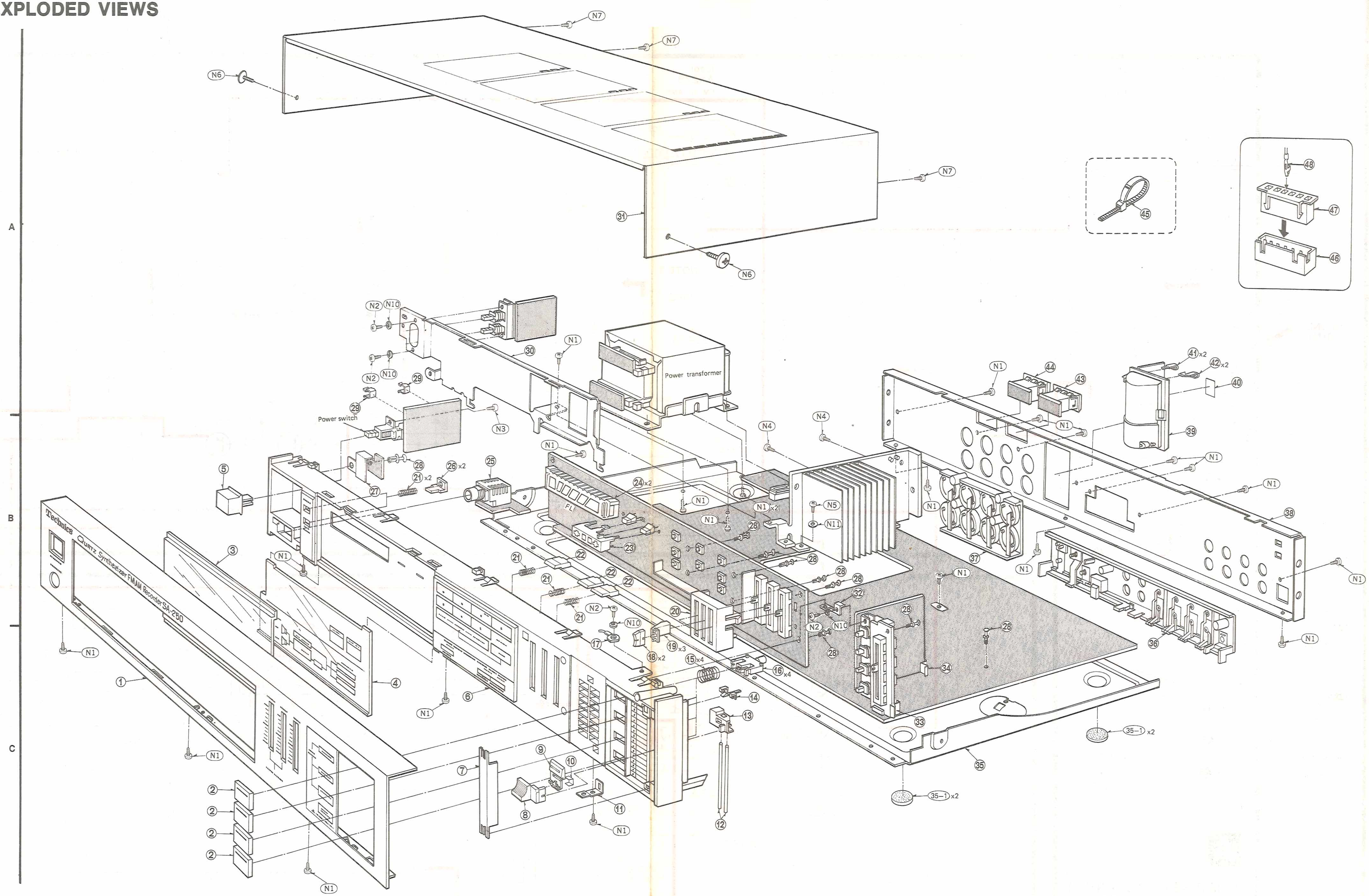
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. Bracketed indications in Ref. No. columns spedify the area.
5. The parenthesized number in the column of description stand for the quantity per set.

Areas

* [M] is available in the U.S.A.
* [MC] is available in Canada.

Ref. No.	Part No.	Part Name & Description
INTEGRATED CIRCUITS		
IC201	AN278	FM IF Amp.
IC202	AN7273A	FM IF Det. & AM Converter
IC301	SVIUPC1161C3	AM AF Amp. FM MPX
IC401	SVINJ4559DDM	Equalizer
IC501	SVINJ4558DSM	Tone Amplifier
IC601 ⚠	STK4152−2M	Power Amplifier
IC901	SVIUPB553AC	Pre-Scaler
IC902	SVID1703C544	PLL Controller (Micro-Computer)
IC903	AN6873N	FL Drive
TRANSISTORS		
Q101	2SK241−GR	FM RF Amp.
Q102 Ⓢ	2SC1674−M	FM Mixer
Q103,104 Ⓢ	2SC1675−L	FM Oscillator, Buffer
Q201,202,204, 205,702,706, 707	2SC1815−Y	Buffer, Switching, Muting, Regulator
Q203,701	2SA1015−Y	Switching
Q703,704	2SA992	
Q705	2SD1265−O	Regulator
Q901,902 Ⓢ	2SC945−Q	L. P. F.
Q903,904,905	2SB641R	Switching
DIODES		
D101,102,103	MA320G1−N	FM Variable Capacitor
D201	SVDKV1236Z	AM Variable Capacitor
D202	MA27W−A	
D203,204,205, 702,703,704	SVD1S2473	Switching
D206,301	LN846RP	L. E. D.
D701 ⚠	SVD1SR35200A	Rectifier
D705,706,799 Ⓢ	MA162A	Switching
D707~710 ⚠	SVDS2V20	Rectifier
D711	MA1062M	Zener, 6.2V
D712,715	RD16EB	Zener, 16V
D713	MA1220L	Zener, 22V
D714	MA1068M	Zener, 6.8V
D901~904, 907~917	SVD1S2473	Switching
D905,906 Ⓢ	MA162A	Switching
COILS		
L101	SLA4N41	FM Antenna
L102,104	ELEPK1R2MA	Choke
L103	SLD4P87	FM Detector
L105	SL04N27−P	FM OSC
L201	SLA2B1−P	AM Antenna
L202	SL02B7−P	AM OSC
L601,602	SLQY07G−30	Choke
TRANSFORMERS		
T201	SLI2B101−M	AM IFT
T202	SLI4B519−P	FM IFT
T701〔M〕only ⚠	SLT5M369−W	Power Source
T701〔MC〕only ⚠	SLT5M371−W	Power Source
CERAMIC FILTERS		
CF201,202	SVFE107MS8A SVFE107MS8B SVFE107MS8C	FM 10.7MHz (Red) FM 10.68MHz (Blue) FM 10.72MHz (Orange)
(Use pair rancks as same as CF201 and CF202)		
CF203	SVFSFZ450F7L	AM 450KHz
VARIABLE RESISTORS		
VR301	EVNE4AA00B53	FM MPX VCO Adjustment, 5kΩ (B)
VR501,502	EWANA6X05C15	Tone, 100kΩ(C)
VR601	EWANF5X05G15	Balance, 100kΩ(G)
VR602	EWAPBAX05B15	Volume, 100kΩ(B)
VARIABLE CAPACITORS		
CT101	ECRHA007A11	FM OSC
CT201	ECRHA010A11	AM Antenna
COMPONENT COMBINATIONS		
Z301,302	EXRP181K473C	180pF, 47kΩ
Z901	EXBP87104M	100kΩ(×7)
CRYSTAL		
X901	SVQ43U452−D	4.5MHz
FLUORESCENT DISPLAY TUBE		
FL	SAD7BT05A	
LAMP		
PL701 ⚠	XAMS6Q17	12V, 110mA
FUSE		
F1 ⚠	XBA1F30NU14	125V, 3A
SWITCHES		
S201	SSH1160	FM/AM Band Selector
S202	SSH179	FM Mode
S501~504	SSH478	Input Selector
S601,602	SSH2087	Speakers Selector
S603	SSH1005	Loudness
S701 ⚠	SSH1071	Power Source
S901~910	SSG13	Preset Tuning, Tuning, Memory

EXPLODED VIEWS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29
Power switch
N3
Power transformer
41 x2
42 x2
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21 x2
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24 x2
FL
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Technics Quartz Synthesizer FM/AM Receiver SA-250
3
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Printed in Japan
840204340 Ⓚ SH/TN
840504340 840603700

ORDER NO. HAD84072839A8–T

Service Manual

Tentative

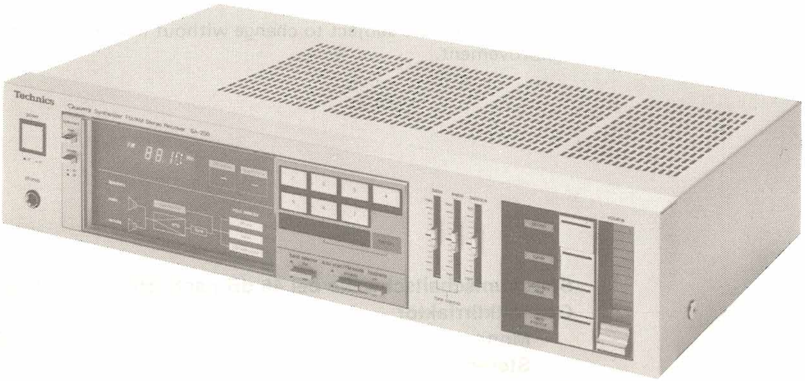
QUARTZ Synthesizer FM/AM Stereo Receiver

Receiver

SA-250

Colors

(S) · · · · Silver Type
(K) · · · · Black Type



Color	Area	
(S) (K)	[EX] · · ·	Scandinavia and Switzerland
(S) (K)	[EH] · · ·	Holland
(S)	[XA] · · ·	Southeast Asia, Oceania, Africa, Middle Near East and Central South America
(S) (K)	[XL] · · ·	Australia
(S)	[XM] · · ·	Latin America

Please use this manual together with the service manual for Model No. SA-250 [M] , Order No. HAD84022714C1.

English

SPECIFICATIONS

(DIN 45 500)

■ AMPLIFIER SECTION

1 kHz continuous power output	
both channels driven	2 × 37W (8Ω)
Total harmonic distortion	
half power at 1 kHz	0.02% (8Ω)
Intermodulation distortion	
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.5%
Power bandwidth	
both channels driven, −3 dB	10 Hz~40 kHz (8Ω)
Damping factor	30 (8Ω)
Input sensitivity and impedance	
PHONO	2.5 mV/47kΩ
CD/VIDEO/AUX, TAPE/EXT	150 mV/18kΩ
PHONO maximum input voltage (1 kHz, RMS)	150 mV
S/N	
rated power (8Ω)	
PHONO	70 dB (IHF, A: 72 dB)
CD/VIDEO/AUX, TAPE/EXT	88 dB (IHF, A: 95 dB)
Frequency response	
PHONO	RIAA standard curve ±0.8 dB (30 Hz~15 kHz)
CD/VIDEO/AUX, TAPE/EXT	5 Hz~70 kHz (−3 dB)
Tone controls	
BASS	50 Hz, +10 dB~ −10 dB
TREBLE	20 kHz, +10 dB~ −10 dB
Loudness control (volume at −30 dB)	50 Hz, +9 dB
Output voltage	
TAPE/EXT (REC OUT)	150 mV
Channel balance, 250 Hz~6,300 Hz	±1 dB
Channel separation	55 dB
Headphones output level and impedance	420 mV/330Ω
Load impedance	
MAIN or REMOTE	8Ω~16Ω
MAIN and REMOTE	8Ω~16Ω

■ FM TUNER SECTION

Frequency range	87.50~108.00 MHz
Sensitivity	
S/N 30 dB	1.9 μV (300Ω), 1.3 μV (75Ω)
S/N 26 dB	1.7 μV (300Ω), 1.2 μV (75Ω)
S/N 20 dB	1.5 μV (300Ω), 0.9 μV (75Ω)
IHF usable sensitivity	1.9 μV (IHF '58)
IHF 46 dB stereo quieting sensitivity	22 μV/75Ω
Total harmonic distortion	
MONO	0.15%
STEREO	0.3%
S/N	
MONO	60 dB (77 dB, IHF)
STEREO	58 dB (71 dB, IHF)
Frequency response	20 Hz~15 kHz, +1 dB~ −2 dB
Alternate channel selectivity ±400 kHz	65 dB
Capture ratio	1 dB
Image rejection at 98 MHz	50 dB
IF rejection at 98 MHz	75 dB
Spurious response rejection at 98 MHz	82 dB
AM suppression	50 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	−33 dB (−35 dB, IHF)
38 kHz	−50 dB (−50 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	±1.5 dB
Limiting point	1.2 μV
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	300Ω (balanced) 75Ω (unbalanced)

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ AM TUNER SECTION

Frequency range	522~1611 kHz (9 kHz step)
Sensitivity (S/N 20 dB)	20 μV, 300 μV/m
Selectivity	55 dB
Image rejection at 999 kHz	40 dB
IF rejection at 999 kHz	60 dB

■ GENERAL

Power consumption	180W
Power supply	
For Australia	AC 50 Hz/60 Hz, 240V
For continental Europe	AC 50 Hz/60 Hz, 220V
For others	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W×H×D)	430 × 97 × 243 mm (16-15/16" × 3-13/16" × 9-9/16")
Weight	5 kg (11 lb.)

Specifications are subject to change without notice for further improvement.

Deutsch

TECHNISCHE DATEN

(DIN 45 500)

■ VERSTÄRKERTEIL

Dauerton-Ausgangsleistung bei 1 kHz	
beide Kanäle ausgesteuert	2 × 37W (8Ω)
Gesamtklirrfaktor	
halbe Nennleistung bei 1 kHz	0,02% (8 Ω)
Intermodulationsfaktor	
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω	0,5%
Leistungsbandbreite	
beide Kanäle ausgesteuert bei −3 dB	10 Hz ~ 40 kHz (8 Ω)
Dämpfungsfaktor	30 (8 Ω)
Eingangsempfindlichkeit und -impedanz	
Phono	2,5 mV/47 kΩ
CD/VIDEO/AUX, TAPE/EXT	150 mV/18 kΩ
Maximale TA-Eingangsspannung (1 kHz, eff.)	150 mV
Geräuschabstand	
Nennleistung (8 Ω)	
Phono	70 dB (nach IHF, A: 72 dB)
CD/VIDEO/AUX, TAPE/EXT	88 dB (nach IHF, A: 95 dB)
Frequenzgang	
Phono	RIAA-Standardkurve ±0,8 dB (30 Hz ~ 15 kHz)
CD/VIDEO/AUX, TAPE/EXT	5 Hz ~ 70 kHz (−3 dB)
Klangregler	
Baßregler (BASS)	50 Hz, +10 dB ~ −10 dB
Höhenregler (TREBLE)	20 kHz, +10 dB ~ −10 dB
Gehörrichtige Lautstärkekorrektur (Loudness)	
(bei −30 dB Ausgangsleistung)	50 Hz, +9 dB
Ausgangsspannung	
TAPE/EXT (REC OUT)	150 mV
Kanalabweichung (250 Hz ~ 6300 Hz)	±1 dB
Übersprechdämpfung	55 dB
Kopfhörerpegel und -impedanz	420 mV/330 Ω
Lautsprecherimpedanz	
MAIN oder REMOTE	8 Ω ~ 16 Ω
MAIN und REMOTE	8 Ω ~ 16 Ω

■ UKW-TUNERTEIL

Wellenbereich	87,50 ~ 108,00 MHz
Eingangsempfindlichkeit	
S/R 30 dB	1,9 μV (300 Ω), 1,3 μV (75 Ω)
S/R 26 dB	1,7 μV (300 Ω), 1,2 μV (75 Ω)
S/R 20 dB	1,5 μV (300 Ω), 0,9 μV (75 Ω)
Nutzempfindlichkeit nach IHF	1,9 μV (nach IHF '58)
Stereoumschaltschwelle bei 46 dB nach IHF	22 μV/75 Ω
Gesamtklirrfaktor	
Mono	0,15%
Stereo	0,3%
Geräuschabstand	
Mono	60 dB (77 dB nach IHF)
Stereo	58 dB (71 dB nach IHF)
Frequenzgang	20 Hz ~ 15 kHz (+1 dB ~ −2 dB)
Trennschärfe bei Störsender ±400 kHz	65 dB
Einfangverhältnis	1 dB
Spiegelfrequenz-Dämpfung bei 98 MHz	50 dB
ZF-Dämpfung bei 98 MHz	75 dB
Ansprechdämpfung auf Nebenfrequenzen bei 98 MHz	82 dB
MW-Unterdrückung	50 dB
Übersprechdämpfung	
1 kHz	40 dB
10 kHz	30 dB
Trägerrest	
19 kHz	−33 dB (−35 dB nach IHF)
38 kHz	−50 dB (−50 dB nach IHF)
Kanalabweichung (250 Hz ~ 6300 Hz)	±1,5 dB
Begrenzereinsatz	1,2 μV
Bandbreite	
ZF-Verstärker	180 kHz
UKW-Demodulator	1000 kHz
Antennenanschluß	300 Ω (symmetrisch) 75 Ω (unsymmetrisch)

■ MW-TUNERTEIL

Wellenbereiche	522 ~ 1611 kHz (9-kHz-Schritte)
Eingangsempfindlichkeit (S/R 20 dB)	20 μV, 300 μV/m
Trennschärfe	55 dB
Spiegelfrequenz-Dämpfung bei 999 kHz	40 dB
ZF-Dämpfung bei 999 kHz	60 dB

■ ALLGEMEINE DATEN

Leistungsaufnahme	180 W
Netzspannung	
Für Australien Wechselstrom	50Hz/60Hz, 240V
Für Kontinentaleuropa	Wechselstrom 50 Hz/60 Hz, 220V
Für andere Länder	Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V
Abmessungen (B×H×T)	430 × 97 × 243 mm
Gewicht	5 kg

Spezifikationen können infolge von Verbesserungen ohne Ankündigung geändert werden.

Français

CARACTERISTIQUES

(DIN 45 500)

■ SECTION AMPLIFICATEUR

Puissance de sortie continue à 1 kHz	
les deux canaux en circuit	2 × 37W (8Ω)
Distorsion harmonique totale	
à demi-puissance (1 kHz)	0,02% (8Ω)
Distorsion d'intermodulation	
à puissance nominale à 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0,5%
Réponse de fréquences	
les deux canaux en circuit, −3 dB	10 Hz~40 kHz (8Ω)
Coefficient d'amortissement	30 (8Ω)
Sensibilité et impédance d'entrée	
PHONO	2,5 mV/47kΩ
CD/VIDEO/AUX, TAPE/EXT	150 mV/18kΩ
PHONO (tension d'entrée maximum, 1 kHz RMS)	150 mV
Signal/Bruit	
à puissance nominale (8Ω)	
PHONO	70 dB (IHF, A: 72 dB)
CD/VIDEO/AUX, TAPE/EXT (CD/VIDEO/AUX, TAPE/EXT)	88 dB (IHF, A: 95 dB)
Réponse de fréquence	
PHONO	Courbe nominale RIAA ±0,8 dB (30 Hz~15 kHz)
CD/VIDEO/AUX, TAPE/EXT (CD/VIDEO/AUX, TAPE/EXT)	5 Hz~70 kHz (−3 dB)
Réglage de la tonalité	
BASSES (BASS)	50 Hz, +10 dB~ −10 dB
AIGUS (TREBLE)	20 kHz, +10 dB~ −10 dB
Compensateur physiologique (volume à −30 dB)	50 Hz, +9 dB
Tension de sortie	
TAPE/EXT (REC OUT)	150 mV
Equilibrage des canaux, 250 Hz~6,300 Hz	±1 dB
Séparation des canaux	55 dB
Niveau de sortie des casques et impédance	420 mV/330Ω
Impédance de charge	
PRINCIPALE ou AUXILIAIRE (MAIN or REMOTE)	8Ω~16Ω
PRINCIPALE et AUXILIAIRE (MAIN and REMOTE)	8Ω~16Ω

■ SECTION SYNTONISATEUR FM

Gamme de fréquence	87,50~108,00 MHz
Sensibilité	
S/B 30 dB	1,9 μV (300Ω), 1,3 μV (75Ω)
S/B 26 dB	1,7 μV (300Ω), 1,2 μV (75Ω)
S/B 20 dB	1,5 μV (300Ω), 0,9 μV (75Ω)
Sensibilité utilisable IHF	1,9 μV (IHF '58)
Sensibilité stéréo au seuil de 46 dB, IHF	22 μV/75Ω
Distorsion harmonique totale	
MONO	0;15%
STEREO	0,3%
Signal/Bruit	
MONO	60 dB (77 dB, IHF)
STEREO	58 dB (71 dB, IHF)
Réponse de fréquence	20 Hz~15 kHz, +1 dB~ −2 dB
Sélectivité alternée par canal ±400 kHz	65 dB
Taux de capture	1 dB
Rejection d'image à 98 MHz	50 dB
Rejection FI à 98 MHz	75 dB
Rejection de réponse parasite à 98 MHz	82 dB
Suppression AM	50 dB
Séparation stéréophonique	
1 kHz	40 dB
10 kHz	30 dB
Fuite de porteuse	
19 kHz	−33 dB (−35 dB, IHF)
38 kHz	−50 dB (−50 dB, IHF)
Equilibrage de canaux (250 Hz~6,300 Hz)	±1,5 dB
Point de limite	1,2 μV
Largeur de bande	
Amplificateur FI	180 kHz
Démodulateur FM	1000 kHz
Bornes d'antenne	300Ω (symétrique) 75Ω (asymétrique)

■ SECTION SYNTONISATEUR AM

Gamme de fréquence	522~1611 kHz (par palier 9 kHz)
Sensibilité (S/B 20 dB)	20 μV, 300 μV/m
Sélectivité	55 dB
Réjection d'image à 999 kHz	40 dB
Réjection FI à 999 kHz	60 dB

■ DIVERS

Consommation	180W
Alimentation	
Pour Australien	CA 50Hz/60Hz, 240V
Pour l'Europe	CA 50 Hz/60 Hz, 220V
Autres	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (L×H×Pr)	430 × 97 × 243 mm
Poids	5 kg

Sujet á changement sans préaris.

Español

ESPECIFICACIONES

(DIN 45 500)

■ SECCION AMPLIFICADOR

Potencia continua de 1 kHz	
en ambos canales	2 × 37W (8Ω)
Distorsión armónica total	
mitad de potencia a 1 kHz	0,02% (8Ω)
Distorsión por intermodulación	
potencia de régimen a 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0,5%
Ancho de banda de potencia	
con ambos canales, −3 dB	10 Hz~40 kHz (8Ω)
Factor de amortiguamiento	30 (8Ω)
Sensibilidad e impedancia de entrada	
TOCADISC. (PHONO)	2,5 mV/47kΩ
CD/VIDEO/AUX.,TAPE/EXT (CD/VIDEO/AUX, TAPE/EXT)	150 mV/18kΩ
Voltaje máximo de entrada de PHONO (1 kHz, RMS)	150 mV
Relación de señal a ruido	
potencia de régimen (8Ω)	
TOCADISC. (PHONO)	70 dB (IHF, A: 72 dB)
CD/VIDEO/AUX., TAPE/EXT (CD/VIDEO/AUX, TAPE/EXT)	88 dB (IHF, A: 95 dB)
Respuesta de frecuencia	
TOCADISC. (PHONO)	curva RIAA estándar ±0,8 dB (30 Hz~15 kHz)
CD/VIDEO/AUX., TAPE/EXT (CD/VIDEO/AUX, TAPE/EXT)	5 Hz~70 kHz (−3 dB)
Controles de tono	
BAJOS (BASS)	50 Hz, +10 dB~ −10 dB
AGUDOS (TREBLE)	20 kHz, +10 dB~ −10 dB
Control de sonoridad (volumen a −30 dB)	50 Hz, +9 dB
Voltaje de salida	
TAPE/EXT (REC OUT)	150 mV
Equilibrio de canales, 250 Hz a 6,300 Hz	±1 dB
Separación de canales	55 dB
Impedancia y nivel de salida de los auriculares	420 mV/330Ω
Impedancia de carga	
MAIN o REMOTE	8Ω~16Ω
MAIN y REMOTE	8Ω~16Ω

■ SECCION PARA SINTONIZADOR FM

Gama de frecuencias	87,50~108,00 MHz
Sensibilidad	
Señal a ruido 30 dB	1,9 μV (300Ω), 1,3 μV (75Ω)
Señal a ruido 26 dB	1,7 μV (300Ω), 1,2 μV (75Ω)
Señal a ruido 20 dB	1,5 μV (300Ω), 0,9 μV (75Ω)
Sensibilidad utilizable IHF	1,9 μV (IHF '58)
Sensibilidad de acallamiento estéreo de 46 dB IHF	22 μV/75Ω
Distorsión armónica total	
MONO. (MONO)	0,15%
ESTEREO (STEREO)	0,3%
Relación de señal a ruido	
MONO. (MONO)	60 dB (77 dB, IHF)
ESTEREO (STEREO)	58 dB (71 dB, IHF)
Respuesta de frecuencia	20 Hz~15 kHz, +1 dB~ −2 dB
Selectividad alternada de canal ±400 kHz	65 dB
Relación de captura	1 dB
Rechazo de imagen a 98 MHz	50 dB
Rechazo de F.I. a 98 MHz	75 dB
Rechazo de respuesta espuria a 98 MHz	82 dB
Supresión AM	50 dB
Separación estereofónica	
1 kHz	40 dB
10 kHz	30 dB
Fuga de onda portadora	
19 kHz	−33 dB (−35 dB, IHF)
38 kHz	−50 dB (−50 dB, IHF)
Equilibrio de canales 250 Hz~6 300 Hz	±1,5 dB
Punto de límite	1,2 μV
Ancho de banda	
Amplificador FI	180 kHz
Demodulador FM	1000 kHz
Bornes de antena	300Ω (equilibrado) 75Ω (no equilibrado)

■ SECCION PARA SINTONIZADOR AM

Gama de frecuencias	522~1611 kHz (9 kHz pasos)
Sensibilidad (Relación de señal a ruido de 20 dB)	20 μV, 300 μV/m
Selectividad	55 dB
Rechazo de imagen a 999 kHz	40 dB
Rechazo de F.I. a 999 kHz	60 dB

■ GENERAL

Consumo de energía	180W
Alimentación de energía	
Para Australien	CA 50Hz/60Hz, 240V
Para Europa continental	CA 50 Hz/60 Hz, 220V
Para otros paises	CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensiones (An.×Al.×Prof.)	430 × 97 × 243 mm
Peso	5 kg

Estas especificaciones están sujetas a cualquier cambio sin previo eviso.

■ BEFORE REPAIR AND ADJUSTMENT

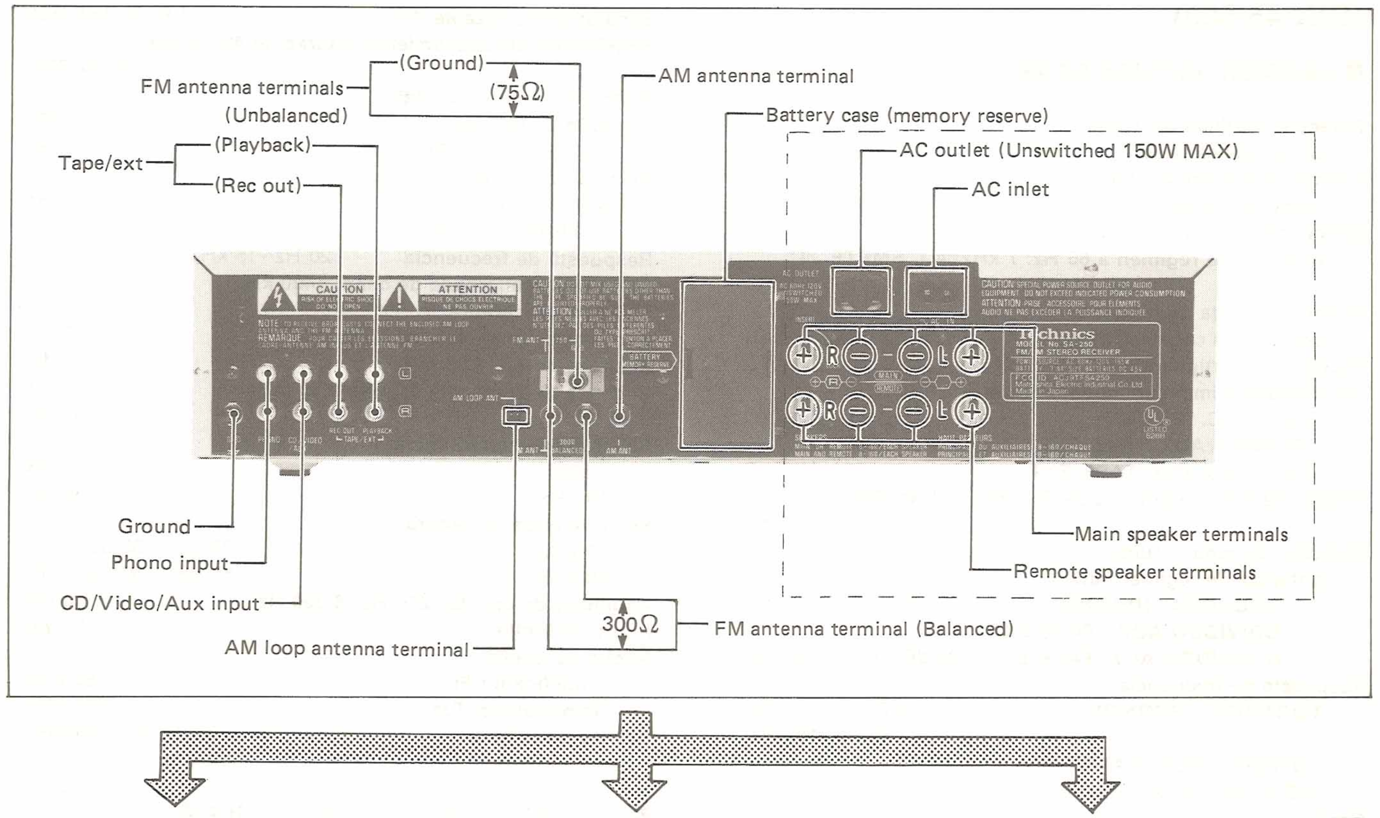
1. Turn off the power supply and short-circuit of power supply capacitors (C706, C707, 6800μF) at resistance (about 10Ω, 5W) in order to discharge the charged voltage. Do not short between C706 and C707 by screwdriver.
   It may damage the component.
2. Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current is free of abnormality. The consumed current at 60Hz/50Hz in no signal mode is shown below with respect to supply voltage 110V/120V/220V/240V.

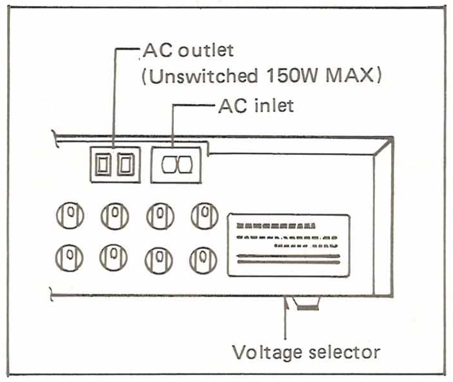
Power supply voltage		AC110V	AC120V	AC220V	AC240V
Consumed current	50Hz	120 ~ 420mA	110 ~ 410mA	70 ~ 220mA	60 ~ 210mA
	60Hz	110 ~ 410mA	100 ~ 400mA	60 ~ 210mA	50 ~ 200mA

LOCATION OF CONTROLS

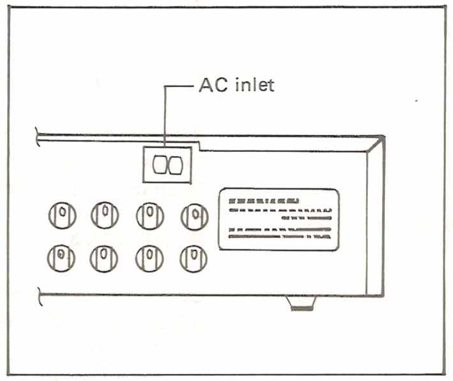
- **Change of the Rear Panel**

For [M] area

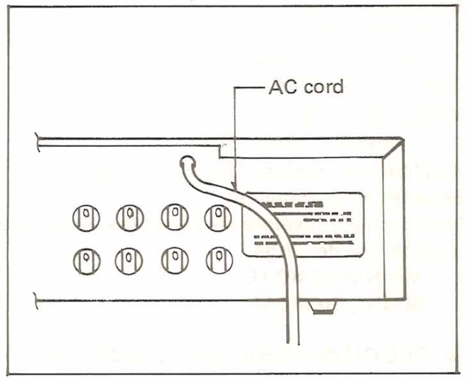




For [XA, XM] areas



For [EX, EH] areas



For [XL] area

- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.

* [XA, XM] areas is provided with voltage selector and AC outlets.
* 240V (50/60Hz) for Australia.
* 220V (50/60Hz) for Continental Europe.
* 110V/120V/220V/240V (50/60Hz) for other [XA, XM] areas.
* Phono input capacitance is about 150pF.

MEASUREMENTS AND ADJUSTMENTS

- Additional of FM mono distortion adjustment.

	FM MONO DISTORTION ADJUSTMENT				
6 7	Connect FM-SG to FM antenna terminal. (Apply 60 dB to antenna terminal.)	100.00 MHz (100% Mod. with 400 Hz)	100.00 MHz	Connect DC VTVM between TP201 and TP202 through choke coil. (Refer to Fig. 10)	T202 (Discri. IFT)	1. Adjust T202 core so that voltage measured in signal mode is 0 mV in 300 mV range. 2. Adjust T203 core so that distortion of right and left channels are minimized.
				Connect distortion analyser to "OUTPUT" terminals.	T203 (Discri. IFT)	

MESSUNGEN UND JUSTIERUNGEN

Anmerkung: Die AM OSC-Spule (L202) und AM ZFT (T201) sind bereits justiert und benötigen keine Justierung.

AM (MW)-EINSTELLUNG

- **Einstellungen und zu benutzende Geräte**

1. Elektronische Voltmeter für Wechselstrom (EVM).
2. AM (MW)-Meßsender (AM-SG)
3. Bereichsschalter .... AM (MW-Abgleich)
4. Die Netzspannung auf ihren Sollwert einstellen.
5. Der Ausgang des Meßsenders darf nicht höher sein als unbedingt notwendig für eine gute Ablesung.
6. Einen nichtmetallischen Schraubenzieher für die Einstellungen verwenden.

Nr.	AM (MW)-MESSENDER		ANZEIGE-FREQUENZ	VORBEREITUNG	ABGLEICHS-PUNKTE	ABGLEICHSVERFAHREN
	ANSCHLUSS	FREQUENZ				
	MW-HF-ABGLEICH					
1	AM-MO über 200pF-Kondensator an den anschließen, wie in Abb. 9 gezeigt. (Schwacher Eingang.)	610kHz (400Hz, Modulat. 30%)	610kHz	Wechselstrom-Voltmeter oder Oszilloskop an den Lautsprecheranschluß anschließen.	L201 (MW Ant. Spule)	● Auf max. Ausgang abgleichen. ● Den Ferritkern L201 mit einem Schraubendreher justieren.
2		1500kHz (400Hz, Modulat. 30%)	1500kHz	Wechselstrom Voltmeter oder Oszilloskop an den Lautsprecheranschluß anschließen.	CT201 (MW Osc. Trimmer)	● Auf max. Ausgang abgleichen. ● Die Schritte (1) und (2) wiederholen, bis die Frequenz genau mit der Skalenanzeige übereinstimmt.

FM (UKW)-EINSTELLUNG

- **Einstellungen und zu benutzenden Geräte**

1. UKW-Meßsender (FM-SG).
2. Oszilloskop
3. Elektronische Voltmeter für Wechsel- und Gleichstrom (EVM).
4. Signalfrequenzmesser (meßbar für 19kHz und 108MHz).
5. Den Bereichsschalter auf die "FM"-Position stellen.
6. Den UKW-Betriebsart-Wahlschalter in die Position "off/mono" stellen.
7. Die anderen Einstellungen sind gleich wie beim MW-Abgleich.

* **Vorbereitung des UKW-Meßoszillators (UKW-MO)**

- Die Normal-Eingangsleistung dieses Gerätes beträgt 60 dB (1 mV), 400Hz, 100% Modulation. (Wegen der Dämpfung bei Verwendung von Koaxialkabeln, muß die MO-Ausgangsleistung 6 dB (ZHF) oder mehr betragen; d.h. wenn die Eingangsleistung 60 dB beträgt, muß der MO-Ausgang 66 dB betragen.)

Nr.	FM (UKW)-MESSENDER		ANZEIGE-FREQUENZ	VORBEREITUNG	ABGLEICHS-PUNKTE	ABGLEICHSVERFAHREN
	ANSCHLUSS	FREQUENZ				
	UKW-ZF-ABGLEICH					
3	UKW-MO an UKW-antennenanschluß anschließen, wie in Abb.10 gezeigt. (60 dB an den Antenneneingang anlegen.)	100MHz (400Hz, Modulat. 100%)	100MHz	Ein Gleichstrom-Voltmeter zwischen TP201 (+) und TP202 (—) über eine Drosselspule anschließen (siehe Abb.10)	T202 (Diskriminator ZFT)	● Den Kern von T202 so justieren, daß die gemessene Spannung im signallosen Modus im 300mV Bereich 0mV beträgt.
	UKW-HF-ABGLEICH					
4	UKW-MO an UKW-antennenanschluß anschließen.	90MHz (400Hz, Modulat. 100%)	90MHz	Oszilloskop an den Lautsprecheranschluß anschließen.	L105 (Osc. Spule)	● Auf max. Ausgang abgleichen. ● Die Schritte (4) und (5) wiederholen, bis die Frequenz genau mit der Skalenanzeige ubereinstimmt.
5		106MHz (400Hz, Modulat. 100%)	106MHz	Oszilloskop an den Lautsprecheranschluß anschließen.	CT101 (Ocs. Trimmer)	
	ABGLEICH AUF MIN. VERZERRUNG IN STELLUNG UKW-MONO					
6	UKW-MO an UKW Antennenanschluß anschließen. (60 dB an den Antenneneingang anlegen.)	100,00 MHz (400 Hz Modulat. 100%)	100,00 MHz	Ein Gleichstrom-Voltmerer zwishen TP201 und TP202 über eine Drosselspule anschließen.	T202 (Diskriminator FT)	Den Kern von T202 so justieren, daß die gemessene Spannung im signallosen modus im 300 mV Bereich 0 mV beträgt.
7				Klirrfaktor-Meßbrücke an den Lautsprecheranschluß anschließen.	T203 (Diskriminator FT)	Kern von T203 für minimale Verzerrung der rechten und linken Kanäle justieren.

Nr.	UKW-STEREO-DEKODER-ABGLEICH	
	UNTER VERWENDUNG EINES ZÄHLERS	UNTER VERWENDUNG ALTERNATIVEN SYSTEMS
8	1. Unmoduliertes Mono-Signal 100MHz, 60dB in das Gerät speisen. (siehe Abb. 11) 2. Den UKW-Betriebsart-Wahlschalter auf "on/FM auto" stellen. 3. Frequenzzähler über einen Wiederstand von 100kOhm an TP301 anschließen. 4. **VR301** auf 19kHz±30Hz einstellen.	1. Stereosignal entweder von einem Stereogenerator. oder einem Sender in den Tuner einspeisen. 2. **VR301** so einstellen, daß die Stereolampe aufleuchtet. Schliefer von **VR301** mit Lack sichern, wie in Abb. 12 gezeigt.

MESURAGES ET RÉGLAGES

Nota: La bobine de l'oscillateur de la modulation d'amplitude (L202) et le transformateur de fréquence intermédiaire de modulation d'amplitude (T201) ont déjà été ajustés et ne nécessitent plus de réglage.

RÉGLAGE DE MA

- **Réglage et équipement utilisé**
1. Voltmètres électroniques de courant alternatif (EVM)
2. Générateur du signal MA (AM-SG).
3. Sélecteur de gamme de réglage sur la position "AM"
4. Conserver la tension du secteur à la tension nominale.
5. La sortie du signal du générateur ne doit pas être plus élevée qu'il n'est nécessaire pour obtenir une lecture de sortie.
6. Utiliser un tournevis non-métallique pour la réglage.

Nº	GÉNÉRA TEUR DU SIGNAL MA		FRÉQUENCE D'AFFICHAGE	PRÉPARATIFS	ÉLÉMENTS RÉGLÉS	PROCÉDURE DE RÉGLAGE
	BRANCHEMENT	FRÉQUENCE				
	RÉGLAGE DE MA-RF					
1	Raccorder le générateur de signaux MA (modulation d'ampiitude) à la borne d'antenne MA par l'intermédiaire d'un condensateur de 200pF, en se référant à la Fig. 9. (Entrée faible)	610kHz (modulé à 30% avec 400Hz)	610kHz	Branchez un voltmètre électronique à C.A. ou un oscilloscope à la borne du "haut-parleur" de l'appareil.	L201 (Bobine ANT)	1. Réglez pour un signal de sortie maximum. 2. Régler le noyau ferrite de L201 à l'aide d'un tournevis.
2		1500kHz (modulé à 30% avec 400Hz)	1500kHz	Branchez un voltmètre électronique à C.A. ou un oscilloscope à la borne du "haut-parleur" de l'appareil.	CT201 (Trimmer ANT)	1. Réglez pour un signal de sortie maximum. 2. Réfaire les étapes (1) et (2) jusqu'à ce que la fréquence s'aligne correctement avec l'affichage de la fréquence.

RÉGLAGE DE FM

- **Réglage et équipement untilisé.**
1. Générateur du signal FM (FM-SG).
2. Oscilloscope.
3. Voltmètres électroniques de courant continu (EVM).
4. Compteur de fréquence (19kHz et 108MHz mesurable).
5. Sélecteur . . . . . de gamme de réglage sur la position "FM".
6. Régler le sélecteur de mode d'exploration automatique/FM sur la position "off/mono".
7. Les autres réglages sont les mêmes que pour la mise au point de l'amplitude modulée (AM).

* **Préparatifs du générateur de signaux à Modulation de Fréquence (FM-SG)**
L'entrée normale de l'appareil est de 60dB (1 mV), 400 Hz, modulation de 100%. (Du fait de l'atténuation, utiliser des câbles coaxiaux (IHF). La sortie du générateur de signaux devra être de plus de 6 dB. C'est-à-dire que lorsque l'entrée est de 60 dB, la sortie du générateur de signaux devra être de 66 dB).

Nº	GÉNÉRATEUR DU SIGNAL FM		FREQUENCE D'AFFICHAGE	PRÉPARATIFS	ÉLÉMENTS RÉGLÉS	PROCÉDURE DE RÉGLAGE
	BRANCHEMENT	FRÉQUENCE				
	RÉGLAGE DE FI-FM					
3	Raccorder le générateur de signaux FM à la borne d'antenne FM en se référant à la Fig. 10. (Appliquer 60 dB à la borne d'antenne.)	100MHz (modulè à 100% avec 400Hz)	100MHz	Brancher le voltmètre électronique à C.C. entre TP201 et TP202 à travers la bobine de choc. (Voir la Fig. 10)	T202 (Transfo F! discri.)	1. Régler le noyau T202 de telle sorte que la tension mesurée dans le mode sans signal de mode soit de 0mV dans la plage des 300mV.
	RÉGLAGE DE RF-FM					
4	Raccorder le générateur de signaux FM à la borne d'antenne FM. (Entrée faible)	90MHz (modulè à 100% 400Hz)	90MHz	Branchez un oscilloscope sur les bornes du haut-parleur de l'appareil.	L105 (Bobine de OSC)	1. Réglez pour signal de sortie maximum. 2. Refaire les ètapes (4) et (5).
5		106MHz (Modulé à 100% avec 400Hz)	106MHz	Branchez un oscilloscope sur les bornes du haut-parleur de l'appareil.	CT101 (Trimmer de OSC)	
	RÉGLAGE DE LA DISTORSION FM EN MONO					
6	Raccorder le générateur de signaux FM à la borne d'antenne FM. (Appliquer 60dB à la borne d'antenne)	100,00 MHz (modulé à 100% par 400 Hz)	100,00 MHz	Brancher le voltmètre electronique à C.C. aux bornes TP201 et TP202 à travers la bobine de choc.	T202 (Transfo. FI discri.)	Régler le noyau T202 de telle sorte que la tension mesurée dans le mode sans signal de mode soit de 0 mV dans la plage des 300 mV.
7				Branchez un mesureur de distorsion sur les bornes du hautparleur de l'appareil.	T203 (Transfo. FI discri.)	Régler le noyau T203 de telle sorte que la distortion des canaux de droite et de gauche soit la plus faible.

RÉGLAGE PILOTE MULTIPLEX FM

Nº	EN UTILISANT UN COMETEUR DE FRÉQUENCES	EN UTILISANT UNE VARIANTE
8	1. Signal monophonique non modulé de 100MHz 60 dB appliqué à l'appareil. (Se référer à la Fig. 11) 2. Régler le sélecteur de mode d'exploration automatique/FM sur la position "cn/auto". 3. Branchez le compteur de fréquences sur TP301 à travers une résistance (100kΩ). 4. Régler **VR301** sur 19kHz±30Hz.	1. Appliquez à l'appareil un signal stéréo provenant d'un génerateur ou de la station stéréo an dispositif d'accord. 2. Régler **VR301** jusqu à ce que l'indicateur de stéréophonie S'éclaire. Collez le curseur de **VR301** comme indiqué sur la Fig. 12.

MEDICIONES Y AJUSTE

Nota: La bobina de OSC AM (L202) y IFT AM (T201) han sido yos ajustada y no requieren ajuste.

AJUSTE DE AM

* **Puesta y equipo usado**
1. Voltimetros electronicos de CA (EVM).
2. Generador de señales AM (AM-SG)
3. Poner selector FM-AM en positión "AM".
4. Mantener voltaje de línea a voltaje nominal.
5. La salida de generador de señales no debe ser mayor que la necesaria para obtener una lectura de salida.
6. Para el ajuste use un destornillador no metálico.

Nº	GENERADOR DE SEÑALES AM		FRECUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	CONEXION	FRECUENCIA				
	AJUSTE RF-AM					
1	Conectar AM-SG a terminal de antena AM a través de capacitor 200pF refiriendo a Fig. 9. (Entrada débil)	610kHz (mod. 30% con 400Hz)	610kHz	Conectar EVM de CA u osciloscopio a terminales de "SPEAKER" (altavoz).	L201 (Bobina ANT)	1. Ajustar para salida máxima. 2. Ajustar núcleo de ferrita de L201 con destornillador.
2		1500kHz (Mod. 30% con 400Hz)	1500kHz	Conectar EVM de CA u osciloscopio a terminales de "SPEAKER" (altavoz).	CT201 (Trimer de ANT)	1. Adjustar par salida máxima. 2. Repetir pasos (1) y (2) hasta que la frecuencia se adapte correctamente a la presentación de frecuencia.

AJUSTE DE FM

* **Puesta y equipo usado**
1. Generador de señales FM (FM-SG)
2. Osciloscopio
3. Voltimetros electrónicos de CC (EVM).
4. Frequencimetro (19kHz y 108MHz medibles).
5. Poner selector de banda en posicion "FM".
6. Poner selector de exploración automática/modalidad FM en positión "off/mono".
7. Otras puestas son las mismas que en ajuste AM.

* **Preparación de generador de señales FM (FM-SG)**
1. La entrada standard del aparato es 60dB (1mV), 400Hz, modulación 100% (Debido a atenuación, usando cables coaxiales la salida SG ha de ser 6dB más. Es decir, cuando la entrada 60dB, la salida de SG ha de ser 66dB.)

Nº	FM GENERADOR DE SEÑALES		FRECUENCIA DE PRESENTACION	PREPARACIONES	PIEZAS AJUSTADAS	PROCEDIMIENTO DE AJUSTE
	CONEXION	FREQUENCIA				
	AJUSTE IF-FM					
3	Conectar SG-FM a terminal de antenna FM refiriendo a Fig. 10. (Aplicar 60dB a terminal de antena)	100MHz (Mod. 100% con 400Hz)	100MHz	Connector EVM CC entre terminal TP201 y TP202 a través de bobina de choque. (Referir a Fig. 10).	T202 (Discri. IFT)	1. Ajustar núcleo de T202 de manera que voltaje medido en modalidad de señal sea 0mV en gama de 300mV.
	AJUSTE RF-FM					
4	Conectar SG-FM a terminal de antenna FM. (Entrada débil)	90MHz (Mod. 100% con 400Hz)	90MHz	Conectar osciloscopio a terminales "speaker" (altavoz)	L105 (Bobina OSC)	1. Adjustar para salida máxima. 2. Repetir pasos (4) y (5).
5		106MHz (Mod. 100% con 400Hz)	106MHz	Conectar osciloscopio a terminales "speaker" (altavoz)	CT101 (Trimer de OSC)	
	AJUSTE DE DISTORSION FM MONO					
6	Conectar SG-FM a terminal de antenna FM. (Aplicar 60 dB a terminal de antena)	100,00 MHz (Mod 100% con 400 Hz)	100,00 MHz	Conectar VTVM CC entre terminal TP201 y TP202 a través de bobina de choque.	T202 (Discri. IFT)	Ajustar núcleo de T202 de manera que voltaje medido en modalidad de señal sea 0 mV en gama de 300 mV.
7				Conectar el analizador de distorsión a terminales de "speaker".	T203 (Discri. IFT)	Ajustar núcleo de T203 de manera que distorsión de canales derecho e izquierdo se minimice.

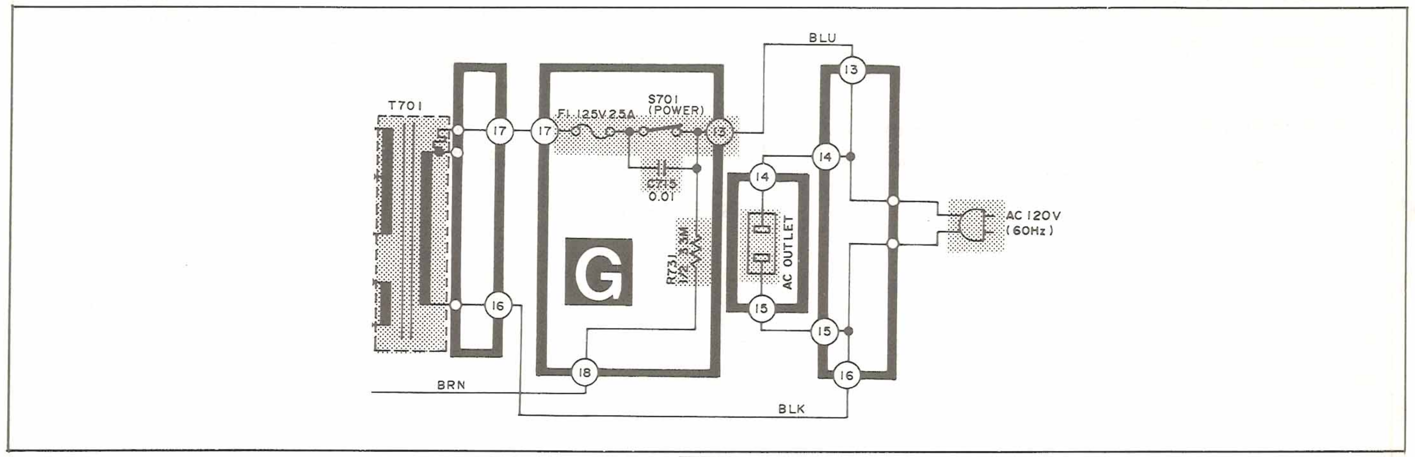
AJUSTE DE (V.C.O.) PILOTO MPX de FM

Nº	USANDO UN FREQUENCIMETRO	USANDO SISTEMA ALTERNATIVO
8	1. Señal mono no modulada de 100. 10MHz 60dB aplicada al aparato. (Referir a Fig. 11) 2. Selector de exploración automática/modalidad FM en posición "on/auto". 3. Conectar frecuéncimetro a TP301 a través de resistor (100kΩ). 4. Ajustar VR301 a 19kHz±30Hz.	1. Aplicar una señal estereofónica de generador o estación estereofónica a sintonizador. 2. Ajustar VR301 hasta que el indicador estereofónico se ilumina, Fijar brazo de VR301 como mostrado en la Fig. 12.

SCHEMATIC DIAGRAM

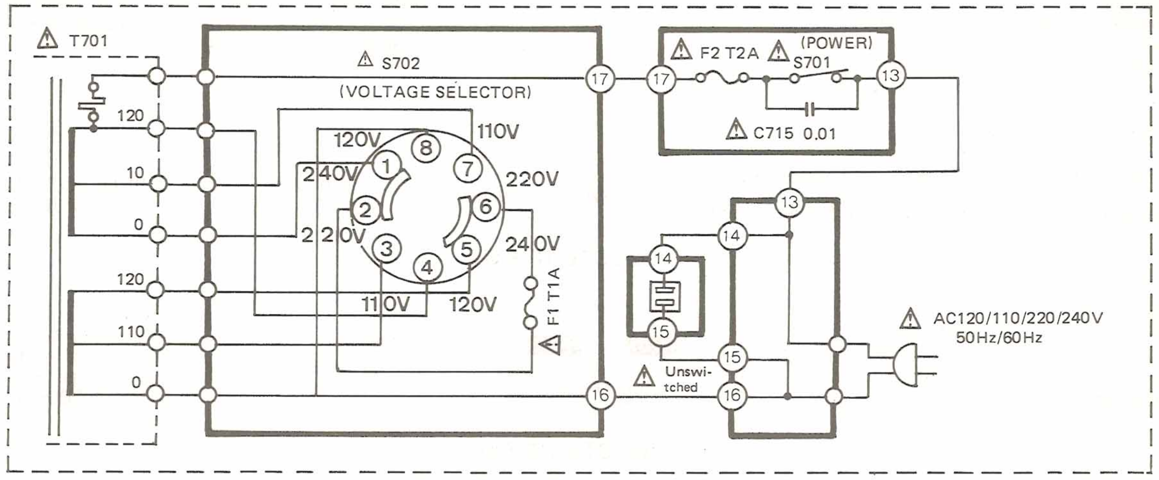
- Change of power supply

For [M] area

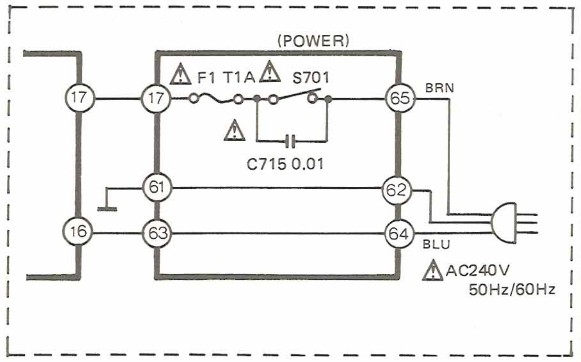

T701
17
F1 125V 2.5A
S701 (POWER)
C715 0.01
R731 1/2W 3.3M
G
AC OUTLET
BLU
13
14
15
16
18
AC 120V (60Hz)
BRN
BLK

Change

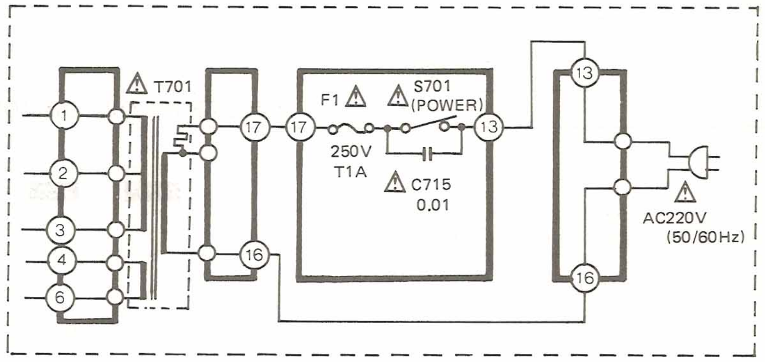
For [XA],[XM] areas


T701
S702 (VOLTAGE SELECTOR)
120
10
0
120
110
0
120V
110V
240V
220V
240V
110V
120V
F1 T1A
F2 T2A
(POWER) S701
C715 0.01
17
13
14
15
16
Unswitched
AC120/110/220/240V 50Hz/60Hz

For [XL] area


(POWER)
F1 T1A
S701
C715 0.01
17
16
61
62
63
64
65
BRN
BLU
AC240V 50Hz/60Hz

For [EX],[EH] areas

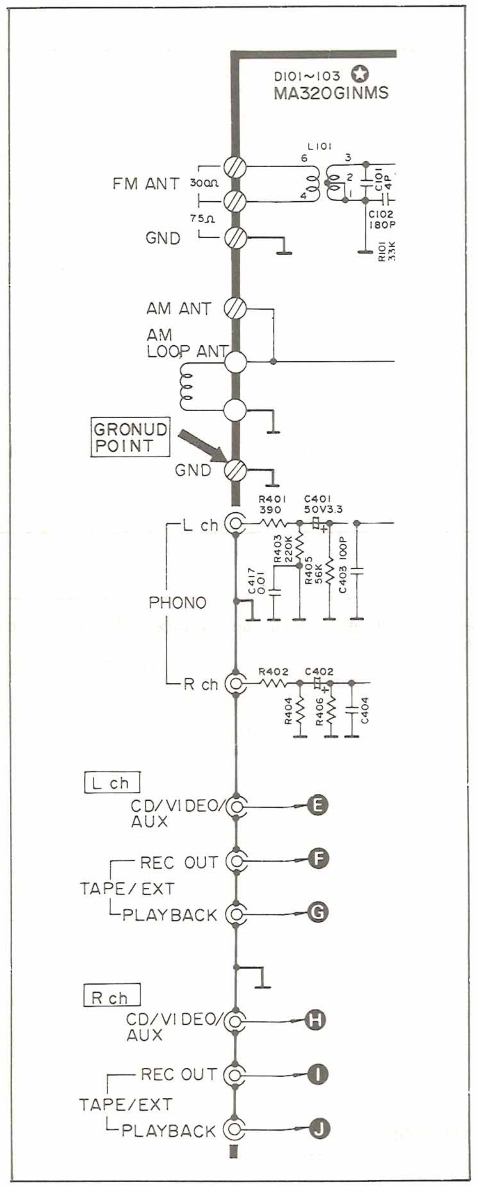

T701
F1
250V T1A
S701 (POWER)
C715 0.01
1
2
3
4
6
17
16
13
AC220V (50/60Hz)

Important safety notice:

Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.

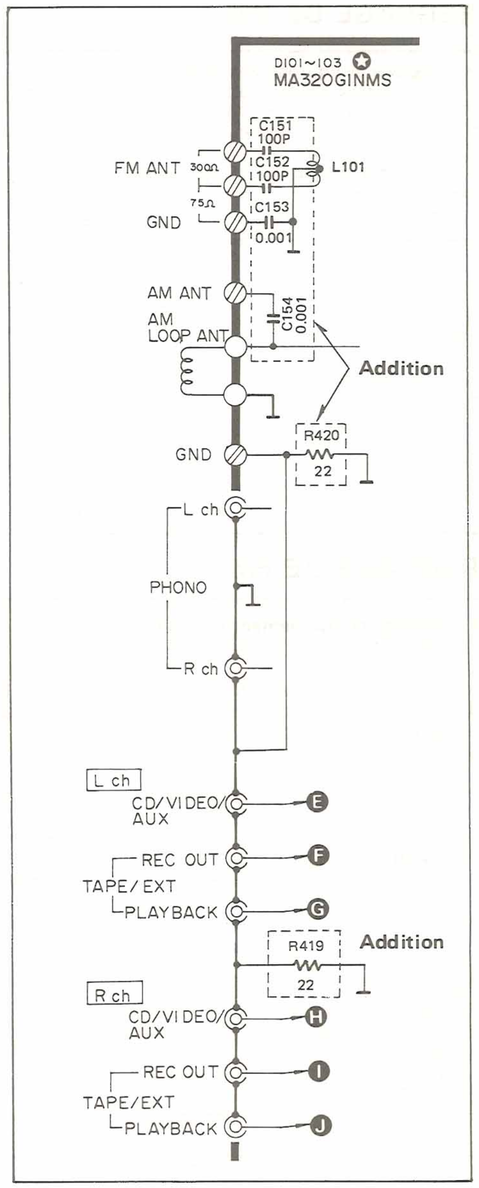
- Change of the antenna, input circuit

For [M] area


D101~103 MA320GINMS
L101
FM ANT 300Ω
75Ω
GND
C101
C102 180P
R101 3.3K
AM ANT
AM LOOP ANT
GRONUD POINT
GND
R401 390
C401 50V3.3
R403 220K
R405 56K
C403 100P
C417 0.01
L ch
PHONO
R ch
R402
C402
R404
R406
C404
L ch
CD/VIDEO/AUX
REC OUT
TAPE/EXT
PLAYBACK
R ch
CD/VIDEO/AUX
REC OUT
TAPE/EXT
PLAYBACK
E
F
G
H
I
J

Change

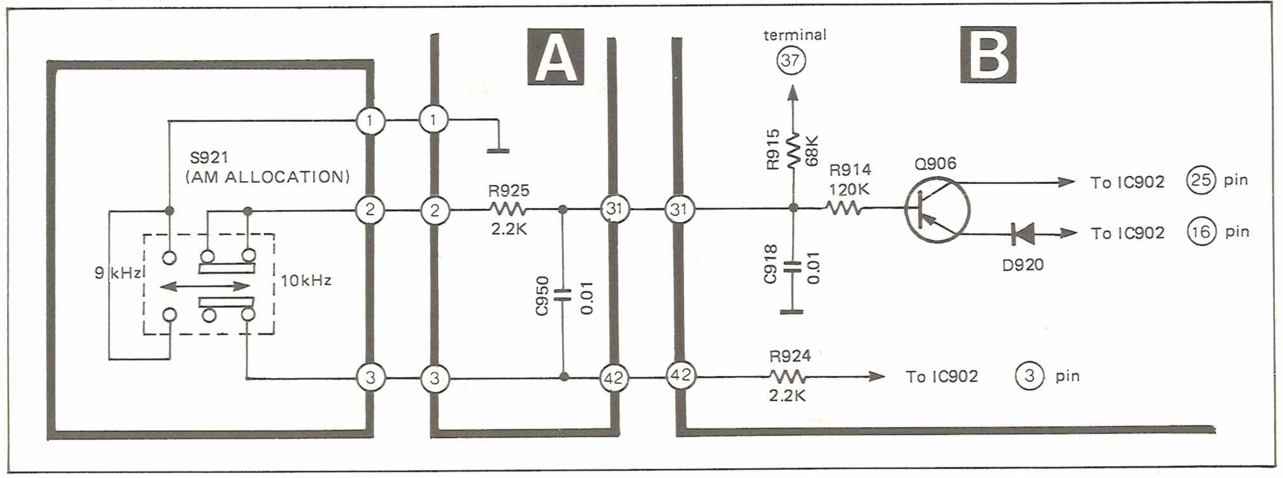
For [XL] area


D101~103 MA320GINMS
C151 100P
C152 100P
C153 0.001
L101
FM ANT 300Ω
75Ω
GND
AM ANT
AM LOOP ANT
C154 0.001
Addition
R420 22
GND
L ch
PHONO
R ch
L ch
CD/VIDEO/AUX
REC OUT
TAPE/EXT
PLAYBACK
R419 22
Addition
R ch
CD/VIDEO/AUX
REC OUT
TAPE/EXT
PLAYBACK
E
F
G
H
I
J

Addition

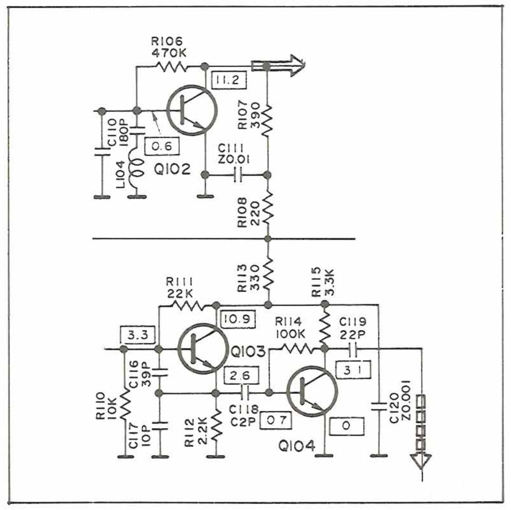
- Change of AM allocation switch

For [XA, XL, XM] areas


A
B
S921 (AM ALLOCATION)
9kHz
10kHz
1
2
3
R925 2.2K
C950 0.01
31
42
terminal 37
R915 68K
R914 120K
C918 0.01
Q906
D920
R924 2.2K
To IC902 25 pin
To IC902 16 pin
To IC902 3 pin

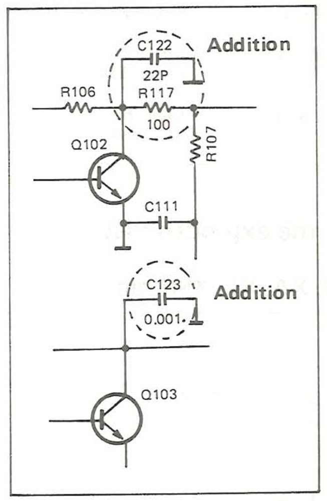
• Change of the capacitors (C122, 123) and resistor (R117)

For [M] area


R106
470K
11.2
R107
390
C110
180P
0.6
L104
Q102
C111
Z0.01
R108
220
R111
22K
R113
330
R115
3.3K
3.3
10.9
R114
100K
C119
22P
Q103
3.1
2.6
C116
39P
R110
10K
C117
10P
R112
2.2K
C118
C2P
0.7
Q104
0
C120
Z0.001

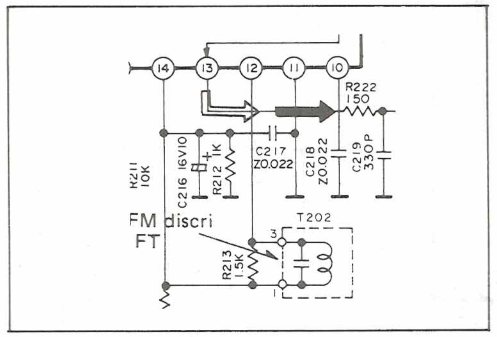
Change

For [EX, EH, XA, XL, XM] area


C122
22P
Addition
R106
R117
100
Q102
R107
C111
C123
0.001
Addition
Q103

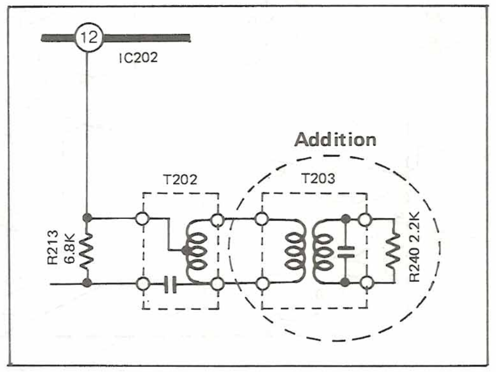
• Change of transformer (T203)

For [M] area


14
13
12
11
10
R222
150
C216 16V10
R212 1K
C217
Z0.022
C218
Z0.022
C219
330P
R211
10K
FM discri
FT
T202
R213
1.5K

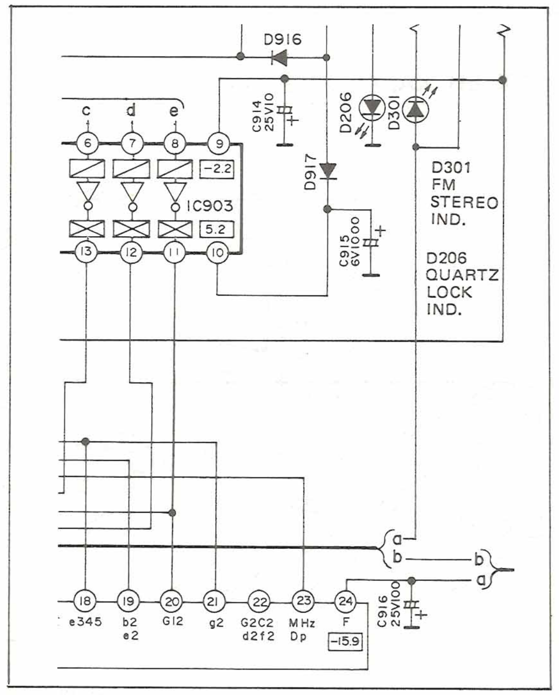
Change

For [EX, EH, XA, XL, XM] areas


12
IC202
Addition
T202
T203
R213
6.8K
R240 2.2K

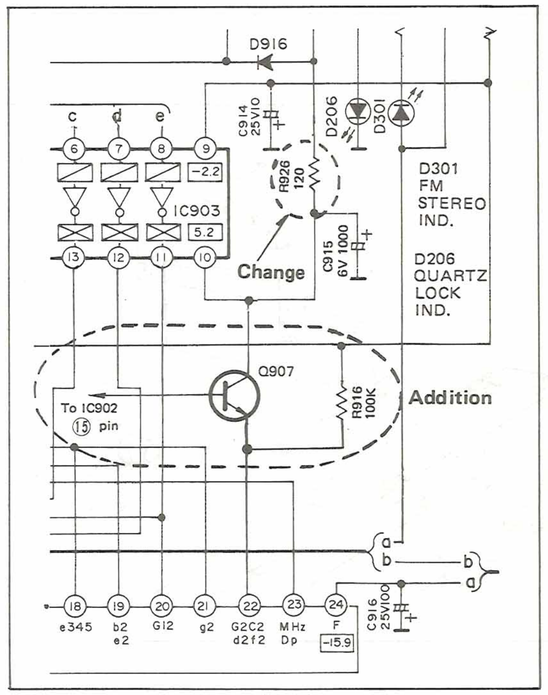
• Change of FL drive circuit

For [M] area


D916
c
d
e
6
7
8
9
-2.2
IC903
5.2
13
12
11
10
C914
25V10
D206
D301
D917
C915
6V1000
D301
FM
STEREO
IND.
D206
QUARTZ
LOCK
IND.
a
b
18
19
20
21
22
23
24
e345
b2
e2
G12
g2
G2C2
d2f2
MHz
Dp
F
-15.9
C916
25V100

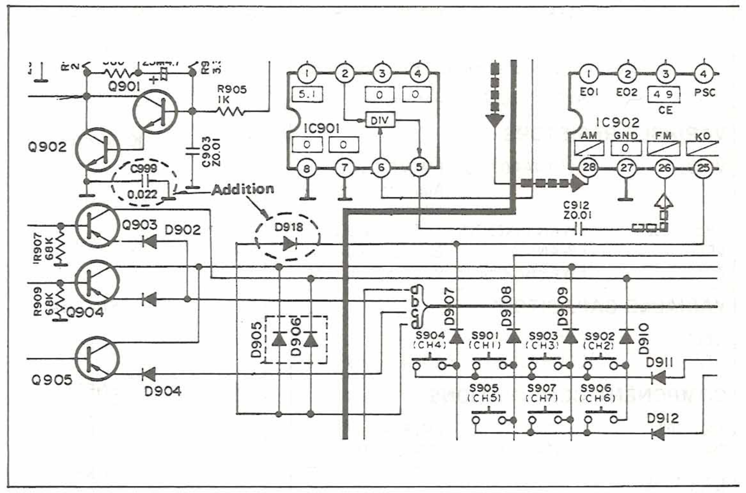
Change

For [EX, EH, XA, XL, XM] areas

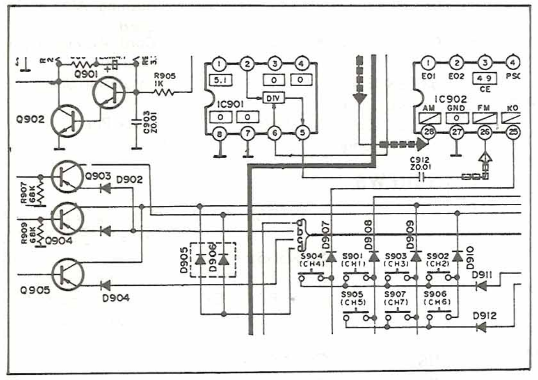

D916
c
d
e
6
7
8
9
-2.2
IC903
5.2
13
12
11
10
C914
25V10
D206
D301
R926
120
Change
C915
6V 1000
D301
FM
STEREO
IND.
D206
QUARTZ
LOCK
IND.
Q907
To IC902
15 pin
R916
100K
Addition
a
b
18
19
20
21
22
23
24
e345
b2
e2
G12
g2
G2C2
d2f2
MHz
Dp
F
-15.9
C916
25V100

• Change of diodes (D918, D919) and capacitor (C999)

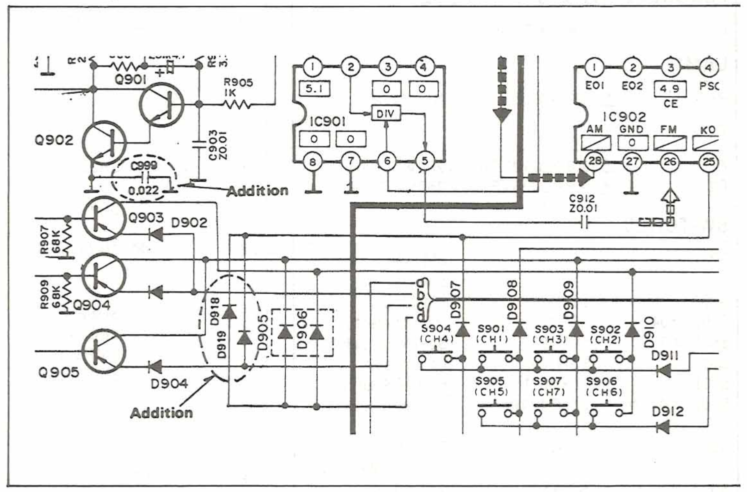
For [XA, XL, XM] areas


Q901
R905
1K
Q902
IC901
5.1
0
DIV
C903
Z0.01
C999
0.022
Addition
D918
IC902
E01
E02
4.9
CE
PSC
AM
GND
FM
KO
28
27
26
25
C912
Z0.01
Q903
D902
R907
68K
R909
68K
Q904
Q905
D904
D905
D906
D907
D908
D909
D910
S904
(CH4)
S901
(CH1)
S903
(CH3)
S902
(CH2)
S905
(CH5)
S907
(CH7)
S906
(CH6)
D911
D912

For [M] area

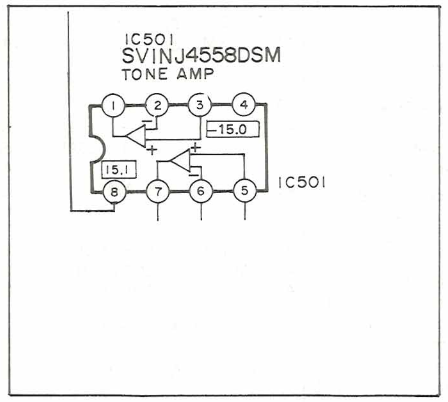

Q901
R905
1K
Q902
IC901
IC902
Q903
D902
Q904
Q905
D904
D905
D906
D907
D908
D909
D910
S904
S901
S903
S902
S905
S907
S906
D911
D912

For [EX, EH] areas


Q901
R905
1K
Q902
IC901
5.1
0
DIV
C903
Z0.01
C999
0.022
Addition
IC902
E01
E02
4.9
CE
PSC
AM
GND
FM
KO
28
27
26
25
C912
Z0.01
Q903
D902
R907
68K
R909
68K
Q904
Q905
D904
Addition
D918
D919
D905
D906
D907
D908
D909
D910
S904
(CH4)
S901
(CH1)
S903
(CH3)
S902
(CH2)
S905
(CH5)
S907
(CH7)
S906
(CH6)
D911
D912

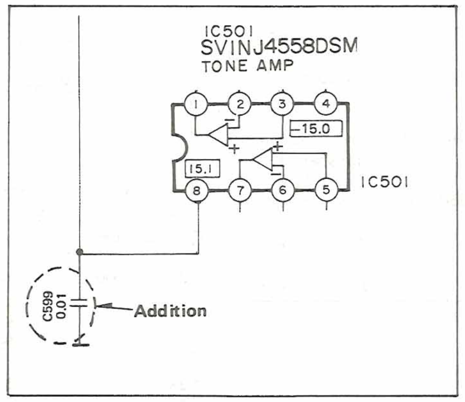
• Change of the capacitor (C599)

For [M] area


IC501
SVINJ4558DSM
TONE AMP
1
2
3
4
-15.0
15.1
8
7
6
5
IC501

Change

For [EX, EH, XA, XL, XM] areas


IC501
SVINJ4558DSM
TONE AMP
1
2
3
4
-15.0
15.1
8
7
6
5
IC501
C599
0.01
Addition

CHANGE IN REPLACEMENT PARTS LIST

Notes:
1. Mentioned in this parts list are only those changed in Model No. SA-250 for destination [M] area.
2. Ⓚ – marked parts are used for black type only, while ○ – marked parts are for sliver type only.
3. Part other than Ⓚ – and ○ – marked are used for both black and silver type.
4. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Part. No.	Change of Part No.		Areas Color	Part Name & Description
	SA-250 [M]	→ SA-250/(K) [EX, EH, XA, XL, XM]		
TRANSISTORS				
Q901, 902	2SC945–Q	2SD636		
Q906	Addition	2SD641R	[XL, XA, XM] only	
Q907	Addition	2SD636		FL drive
DIODES				
D799	MA162A	SVD1S2473		
D917	SVD1S2473	Delation		
D918	Addition	SVD1S2473		
D919	Addition	SVD1S2473	[EX, EH] only	
D920	Addition	SVD1S2473	[XL, XA, XM] only	
TRANSFORMERS				
T202	SLI4B519–P	SLI4B511–Z		FM IFT
T203	Addition	SLI4B513–Z		FM IFT
T701	SLT5M369–W	SLT5M397–W	[EX, EH]	Power Source ⚠
		SLT5M399–W	[XL]	Power Source ⚠
		SLT5M401–W	[XA, XM]	Power Source ⚠
FUSE				
F1	XBA1F30NU14	XBA2C12TR0		250V, T1.2A ⚠
F2	Addition	XBA2C25TR0	[XA, XM] only	250V, T2.5A ⚠
SWITCHES				
S702	Addition	ESE37219	[XA, XM] only	Voltage Selector ⚠
S921	Addition	SSS43	[XL, XA, XM] only	AM Allocation
RESISTORS				
R115	ERD25FJ332	ERD25FJ102		Carbon, ¼W, 1kΩ Ⓢ
R117	Addition	ERD25FJ101		Carbon, ¼W, 100Ω Ⓢ
R213	ERD25FJ152	ERD25FJ682		Carbon, ¼W, 6.8kΩ Ⓢ
R240	Addition	ERD25FJ222		Carbon, ¼W, 2.2kΩ Ⓢ
R301	ERD25FJ103	ERD25TJ273		Carbon, ¼W, 27kΩ Ⓢ
R305, 306	ERD25FJ392	ERD25FJ332		Carbon, ¼W, 3.3kΩ Ⓢ
R309	ERD25TJ274	ERD25TJ334		Carbon, ¼W, 330kΩ Ⓢ
R419, 420	Addition	ERD25FJ220	[XL] only	Carbon, ¼W, 22Ω Ⓢ
R627, 628	ERDS1FJ100	ERDS1FJ222		Carbon, ¼W, 2.2kΩ
R731	ERC12ZGK335	Deration		
R904	ERC14GK335	ERD25TJ335		Carbon, ¼W, 3.3MΩ Ⓢ
R914	Addition	ERD25TJ124	[XL, XA XM]	Carbon, ¼W, 120kΩ Ⓢ
R915	Addition	ERD25TJ683	[XL, XA XM]	Carbon, ¼W, 68kΩ Ⓢ
R916	Addition	ERD25TJ104		Carbon, ¼W, 100kΩ Ⓢ
R924	Addition	ERD25FJ222	[XL, XA, XM]	Carbon, ¼W, 2.2kΩ Ⓢ
R925	Addition	ERD25FJ222	[XA, XA, XM]	Carbon, ¼W, 2.2kΩ Ⓢ
R926	Addition	ERD25FJ121		Carbon, ¼W, 120Ω Ⓢ
CAPACITORS				
C122	Addition	ECCD1H220KC		Ceramic, 50V, 22PF Ⓢ
C123	Addition	ECKD1H102ZF		Ceramic, 50V, 0.001µF Ⓢ
C151, 152	Addition	ECKDHS101MB	[XL]	Ceramic, AC400V, 100PF
C153 154	Addition	ECKDHS102MD	[XL]	Ceramic, AC400V, 0.001µF
C217, 218	ECKD1H103ZF	ECKD1H223ZF		Ceramic, 50V, 0.022µF Ⓢ
C305, 306	ECQM1H183KV	ECQM1H153KV		Polyester, 50V, 0.015µF
C599	Addition	ECKD1H103ZF		Ceramic, 50V, 0.01µF Ⓢ
C621, 622	ECKD1H473ZF	ECQM1H104KV	[XL, XA,	Polyester, 50V, 0.1µF
C918	Addition	ECBT1C103ZYY	[XL, XA, XM]	
C950	Addition	ECKD1H103ZF	[XL, XA, XM]	Ceramic, 50V, 0.01µF Ⓢ
C999	Addition	ECKD1H223ZF		Ceramic, 50V, 0.022µF Ⓢ
CABINET and CHASSIS PARTS				
1	SGWA250–SM	SGWA250–SM	○	Front Panel Ass'y (Silver Type) (1)
		SGWA250–KE	Ⓚ	Front Panel Ass'y (Black Type) (1)
4	SDLA250–SM	SDLA250–SM	○	Cover, Indication Transparent (Silver Type) (1)
		SDLA250–KE	Ⓚ	Cover, Indication Transparent (Black Type) (1)
6	SGXA250–SM	SGXA250–SE	○	Front Sub Panel Ass'y (Silver Type) (1)
		SGXA250–KE	Ⓚ	Front Sub Panel Ass'y (Black Type) (1)
7	SGX7669	SGX7669	○	Ornament (Silver Type) (1)
		SGX7669–1	Ⓚ	Ornament (Black Type) (1)
8	SBD96	SBD96	○	Knob, Volume (Silver Type (1)
		SBD96–1	Ⓚ	Knob Volume (Black Type) (1)
9	SBE295	SBE295A		Spacer, Volume Knob (1)
18	SBD97	SBD97	○	Knob, Tone, Balance (Silver Type) (3)
		SBD97–1	Ⓚ	Knob, Tone, Balance (Black Type) (3)
20	SGX7668	SGX7668	○	Ornament, Tone, Balance (Silver Type) (1)
		SGX7668–1	Ⓚ	Ornament, Tone, Balance (Black Type) (1)
22	SBC565–1T	SBC565–3		Button (3)
26	SBC483–6T	SBC483–6T	○	Button, Speaker (Silver Type) (2)
		SBC483–8T	Ⓚ	Button, Speaker (Black Type) (2)
29	SJT345	SJT347		Holder, Fuse (2)
30	SMC1140	SMC1140–1		Shield Cover (1)
31	SKC1191S1	SKC1191S1	○	Cabinet (Silver Type) (1)
		SKC1191BB1	Ⓚ	Cabinet (Black Type) (1)
35	SKUA250–SM	SKUA150–SE	[EX][EH] [XL]	Botton Board
		SKUA150–SX	[XA]	Bottom Board (1)
38	SGP6160B	SGP6160–6A	[EX] [EH]	Rear Panel (1)
		SGP6160–9A	[XA][XM]	Rear Panel (1)
		SGP6160-10A	[XL]	Panel (1)
43	SJS9232A	————	[EX][EH] [XL]	———— (0)
		SJS9232A	[XA][XM]	AC Outlet (1)
44	SJS9231A	SJS9231A	[EX][EH] [XA][XM]	Socket, Inlet (1)
		————	[XL]	———— (0)

Part. No.	Change of Part No.		Areas	Part Name'& Description
	SA-250 [M]	→ SA-250/(K) [EX, EH, XA, XL, XM]	Color	
49	Addition	SJS9231B	[EX][EH] [XA][XM] only	Socket, Inlet ⚠ (1)
50	Addition	SJS9232B	[XA][XM] only	AC Outlet ⚠ (1)
51	Addition	SHR131	[XL] only	Cord Bushing (1)
52	Addition	QFC1207MA	[XL] only	Cord, AC Power Source (1)
53	Addition	SMX763−1	[XE][EH] [XL]only	Insulation Sheet (1)
54	Addition	SHR415	[EX][EH] [XL]only	Lock Pin (1)
SCREWS				
N6	SNE2095−4	SNE2095−4	○	(Silver Type) (2)
		SNE2095−5	Ⓚ	(Black Type) (2)
N7	XTB3+8BFN	XTB3+8BFN	○	Tapping, ⊕3 x 8 (Silver Type) Ⓢ (3)
		XTB3+8BFZ	Ⓚ	Tapping, ⊕3 x 8 (Black Type) Ⓢ (3)
N20	Addition	XTBS3+6FFZ1		Tapping, ⊕3 x 6 (1)
N21	Addition	XSN3+8BVS	[XA, XM] only	⊕3 x 8 Ⓢ (1)
N22	Addition	XSN26+5FZ	[XA, XM, XL] only	⊕3.6 x 5 (2)
WASHERS				
N30	Addition	XWA3B	[XA, XM] only	Spring, ∮3 x 6 Ⓢ (1)
N31	Addition	XWG3	[XA, XM] only	Plain, ∮3 Ⓢ (1)
N32	Addition	SHW40L150	[XA, XM] only	(1)
N33	Addition	XWA26BFZ	[XA, XM, XL] only	Spring, ∮2.6 (2)

Ref. No.	Change of Part No.		Areas	Part Name & Description
	SA-250 [M]	→ SA-250/(K) [EX, EH, XA, XL, XM]	Color	
ACCESSORIES				
A1	SJA159	SJA155	[EX][XL] only	Cord, AC Power Source ⚠ (1)
		SJA168	[XA][XM] only	Cord, AC Power Source ⚠ (1)
A7	SQF12040	SQF12100	[EX][EH]	Instruction Book (1)
		SQF12101	[XA][XM]	Instruction Book (1)
		SQF12102	[XL]	Instruction Book (1)
A8	Addition	SJP5213−1	[XA][XM] only	Plug Adaptor ⚠ (1)
A9	Addition	SJP5215	[XA][XM] only	Plug Adaptor ⚠ (1)
PACKING PARTS				
P1	SPP699	SPP699	○	Polyethylene Bag (Silver Type) (1)
		SPP649	Ⓚ	Polyethylene Bag (Black Type) (1)
P2	SPS4432	SPS4432	Other areas	Pad, Left Side (1)
		SPS4432−1	[XL] only	Pad, Left Side (1)
P3	SPS4433	SPS4433−1	[XL] only	Pad, Right Side (1)
		SPS4433	Other areas	Pad, Right Side (1)
P4	SPG4815	SPG4894	[XL] only	Carton Box (1)
		SPG4893	Other areas	Carton Box (1)

REPLACEMENT PARTS LIST

Notes:

1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Ⓚ —marked parts are used for black only, while ○ —marked parts are for silver type only.
4. Part other than Ⓚ— and ○—marked are used for both black and silver type.
5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
6. The " Ⓢ " mark is service standard parts and may differ from production parts.
7. The parenthesized numbers in the column of description stand for the quantity per set.

Area	
[EX] · · ·	Scandinavia and Switzerland
[EH] · · ·	Holland
[XA] · · ·	Southeast Asia, Oceania, Africa, Middle Near East and Central South America
[XL] · · ·	Australia
[XM] · · ·	Latin America

Black type model No. SA-250(K)

Ref. No.	Part No.	Part Name & Description
INTEGRATED CIRCUITS		
IC201	AN278	FM IF Amp.
IC202	AN7273A	FM IF Det. & AM Converter
IC301	SVIUPC1161C3	AM AF Amp. FM MPX
IC401	SVINJ4559DDM	Equalizer
IC501	SVINJ4558DSM	Tone Amplifier
IC601 ⚠	STK4152−2M	Power Amplifier
IC901	SVIUPB553AC	Pre-Scaler
IC902	SVID1703C544	PLL Controller (Micro-Computer)
IC903	AN6873N	FL Drive
TRANSISTORS		
Q101	2SK241−GR	FM RF Amp.
Q102 Ⓢ	2SC1674−M	FM Mixer
Q103,104 Ⓢ	2SC1675−L	FM Oscillator, Buffer
Q201,202,204, 205,702,706, 707	2SC1815−Y	Buffer, Switching, Muting, Regulator
Q203,701	2SA1015−Y	Switching
Q703,704	2SA992	Over Load Det.
Q705	2SD1265−O	Regulator
Q901, 902, 907	2SD636	L P.F., FL Drive
Q903, 904, 905, 906	2SB641R	Switching
DIODES		
D101,102,103	MA320G1−N	FM Variable Capacitor
D201	SVDKV1236Z	AM Variable Capacitor
D202	MA27W−A	
D203, 204, 205, 702, 703, 704, 799	SVD1S2473	Switching
D206,301	LN846RP	L. E. D.
D701 ⚠	SVD1SR35200A	Rectifier
D705,706 Ⓢ	MA162A	Switching
D707∼710 ⚠	SVDS2V20	Rectifier
D711	MA1062M	Zener, 6.2V
D712,715	RD16EB	Zener, 16V
D713	MA1220L	Zener, 22V
D714	MA1068M	Zener, 6.8V
D901∼904, 907∼916	SVD1S2473	Switching
D905,906 Ⓢ	MA162A	Switching
D918	SVD1S2473	Switching
D919 [EX, EH] only	SVD1S2473	Switching
D920 [XA, XL, XM]only	SVD1S2473	Switching
COILS		
L101	SLA4N41	FM Antenna
L102,104	ELEPK1R2MA	Choke
L103	SLD4P87	FM Detector
L105	SL04N27−P	FM OSC
L201	SLA2B1−P	AM Antenna
L202	SL02B7−P	AM OSC
L601,602	SLQY07G−30	Choke
TRANSFORMERS		
T201	SLI2B101−M	AM IFT
T202	SLI4B511−Z	FM IFT
T203	SLI4B513−Z	FM IFT
T701 [EX,EH] ⚠	SLT5M397−W	Power Source
T701 [XL] ⚠	SLT5M399−W	Power Source
T701 [XA,XM] ⚠	SLT5M401−W	Power Source

Ref. No.	Part No.	Part Name & Description
CERAMIC FILTERS		
CF201,202	SVFE107MS8A	FM 10.7MHz(Red)
	SVFE107MS8B	FM 10.68MHz (Blue)
	SVFE107MS8C	FM 10.72MHz (Orange)
(Use pair rancks as same as CF201 and CF202)		
CF203	SVFSFZ450F7L	AM 450KHz
VARIABLE RESISTORS		
VR301	EVNE4AA00B53	FM MPX VCO Adjustment, 5kΩ (B)
VR501,502	EWANA6X05C15	Tone, 100kΩ(C)
VR601	EWANF5X05G15	Balance, 100kΩ(G)
VR602	EWAPBAX05B15	Volume, 100kΩ(B)
VARIABLE CAPACITORS		
CT101	ECRHA007A11	FM OSC
CT201	ECRHA010A11	AM Antenna
COMPONENT COMBINATIONS		
Z301,302	EXRP181K473C	180pF, 47kΩ
Z901	EXBP87104M	100kΩ(×7)
CRYSTAL		
X901	SVQ43U452−D	4.5MHz
FLUORESCENT DISPLAY TUBE		
FL	SAD7BT05A	
LAMP		
PL701 ⚠	XAMS6Q17	12V, 110mA
FUSES		
F1 ⚠	XBA2C12TR0	250V, T1.2A
F2 ⚠	XBA2C25TR0	250V, T2.5A
SWITCHES		
S201	SSH1160	FM/AM Band Selector
S202	SSH179	FM Mode
S501∼504	SSH478	Input Selector
S601,602	SSH2087	Speakers Selector
S603	SSH1005	Loudness
S701 ⚠	SSH1071	Power Source
S702 [XA,XM] only	ESE37219	Voltage Selector
S901∼910	SSG13	Preset Tuning, Tuning, Memory
S921 [XL, XA, XM] only	SSS43	AM Allcocation
CABINET and CHASSIS PARTS		
1 ○	SGWA250−SM	Front Panel Ass'y (Silver Type) (1)
1 Ⓚ	SGWA250−KE	Front Panel, Ass'y (Black Type) (1)
2	SBC573−IT	Button, Input Selector (4)
3	SGU409	Transparent Cover (1)
4 ○	SDLA250−SM	Cover, Indication Transparent (Silver Type) (1)
4 Ⓚ	SDLA250−KE	Cover, Indication Transparent (Black Type) (1)
5	SBC627	Button, Power (1)

Ref. No.	Part No.	Part Name & Description
CABINET and CHASSIS PARTS		
6 ○	SGXA250−SE	Front Sub Panel, Ass'y(Silver Type) (1)
6 Ⓚ	SGXA250−KE	Front Sub Panel, Ass'y(Black Type) (1)
7 ○	SGX7669	Ornament (Silver Type) (1)
7 Ⓚ	SGX7669−1	Ornament (Black Type) (1)
8 ○	SBD96	Knob, Volume (Silver Type) (1)
8 Ⓚ	SBD96−1	Knob, Volume (Black Type) (1)
9	SBE295A	Spacer, Volume Knob (1)
10	SHR5274	Spacer, Volume Knob (1)
11	SNE92	Bracket (1)
12	SUG183	Rod, Slider (2)
13	SHR9723	Slider, Volume Knob (1)
14	SHR322	Spacer (1)
15	SUS191−1	Spring, Button (4)
16	SHR9724	Holder (4)
17	SJT231	Terminal (1)
18 ○	SBD97	Knob, Tone, Balance (Silver Type) (3)
18 Ⓚ	SBD97−1	Knob, Tone, Balance (Black Type) (3)
19	SBZ9018	Holder, Knob (3)
20 ○	SGX7668	Ornanent (Silver Oype)T (1)
20 Ⓚ	SGX7668−1	Ornament (Black Type) (1)
21	SUS257	Spring, Button (5)
22	SBC565−3	Button (3)
23	SMP373	Holder, L.E.D (1)
24	SMN1910	Bracket, FL Holder (2)
25	SJJ71B	Jack, Head phones (1)
26 ○	SBC483−6T	Button, Speaker (Silver Type) (2)
26 Ⓚ	SBC483−8T	Button, Speaker (Black Type) (2)
27	SMP377	Holder, Lamp (1)
28	SHR415	Lock Pin (8)
29	SJT347	Holder, Fuse (2)
30	SMC1140−1	Shield Cover (1)
31 ○	SKC1191S1	Cabinet (Silver Type (1)
31 Ⓚ	SKC1191BB1	Cabinet (Black Type) (1)
32	SUW2832	Bracket Switch P.C.B (1)
33	SME103−2	Bracket, P.C.B (1)
34	SME103−3	Bracket, P.C.B (1)
35 [EX, EH, XL]	SKUA150−SE	Bottom Board (1)
35 [XA, XM]	SKUA150−SX	Bottom Board (1)
[35−1	[SKL245−2	Foot (4)
36	SJF8037−15N	Terminal Board (1)
37	SJF4815−2	Terminal Board, Speaker (1)
38 [EX, EH]	SGP6160−6A	Rear Panel (1)
38 [XA, XM]	SGP6160−9A	Rear Panel (1)
38 [XL]	SGP6160−10A	Rear Panel (1)
39	SJB3005−1	Battery Cover (1)
40	SGK1569−1	Label (1)
41	SJC7	Terminal, Battery (2)
42	SJC9	Terminal, Battery (2)

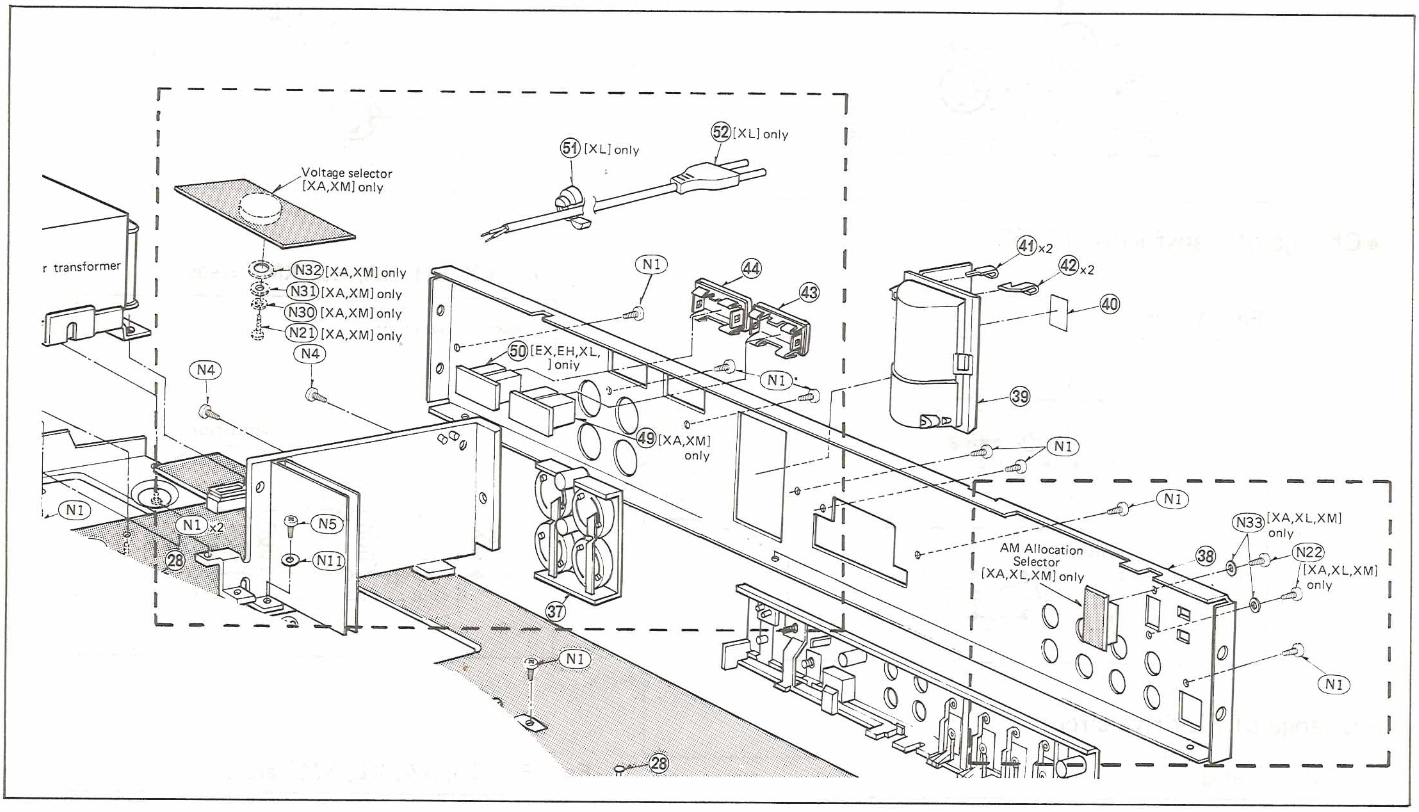
Ref. No.	Part No.	Part Name & Description
43 [XA, XM] only	SJS9232A	Case, Ac Outelt (1)
44 [EX, EH, XA, XM] only	SJS9231A	Case, Inlet (1)
		Case, Inlet (1)
45	SHR301	Clamper (2)
46	SJT3319	Post(3pin) (1)
46	SJT3611	Post(6pin) (1)
46	SJT3213	Post(2pin) (1)
47	SJS5331	Socket(3pin (1)
47	SJS5629	Socket(6pin) (1)
47	SJS5215	Socket(2pin) (1)
48	SJT783	Terminal (11)
49 [XA, XM] only ⚠	SJS9232B	Socket, AC Outlet (1)
50 [EX, EH, XA, XM] only ⚠	SJS9231B	Socket, Inlet (1)
51 [XL] only	SHR131	Bushing, AC Cord (1)
52 [XL] only ⚠	QFC1207MA	Cord, AC Power Source (1)
53 [EX, EH, XL] only	SMX763−1	Insulation Sheet (1)
54 [EX, EH, XL] only	SHR415	Lock Pin (1)
SCREWS		
N1	XTBS3+8BFZ1	Tapping with Detent, ⊕3×8 (22)
N2 Ⓢ	XSN3+6S	⊕3×6 (4)
N3 Ⓢ	XTB3+8BFN	Tapping, ⊕3×8 (1)
N4 Ⓢ	XTB3+14BFN	Tapping, ⊕3×14(2)
N5 Ⓢ	XTN3+8B	Tapping, ⊕3×8 (1)
N6 ○	SNE2095−4	Silver Type (2)
N6 Ⓚ	SNE2095−5	Black Type (2)
N7 Ⓢ○	XTB3+8BFN	Tapping, ⊕3×8 (3)
N7 ⓈⓀ	XTB3+8BFZ	Tapping, ⊕3×8 (3)
N20	XTBS3+6FFZ1	Tapping, ⊕3 x 6 (1)
N21 [XA, XM] only Ⓢ	XSN3+8BVS	⊕ 3 x 8 (1)
N22 [XA, XM, XL] only	XSN26+5FZ	⊕ 2.6 x 5 (2)
WASHERS		
N10 Ⓢ	XWA3B	Spring, ϕ3 (4)
N11 Ⓢ	XWG3	Plain, ϕ3 (1)
N12	XWE3E13	Plain, ϕ3 (1)
N30 [XA, XM] only Ⓢ	XWA3B	Spring, ∮3 (1)
N31 [XA, XM] only Ⓢ	XWG3	Plain, ∮3 (1)
N32 [XA, XM] only Ⓢ	SHW40L150	Plain (1)
N33 [XA, XM, XL] only Ⓢ	XWA26BFZ	Spring, ∮2.6 (2)
ACCESSORIFS		
A1 [EX, EH] ⚠	SJA155	AC Cord (1)
A1 [XA, XM] ⚠	SJA168	AC Cord (1)
A2	SSA902	Loop Antenna (1)
A3	SMA231	Holder (1)
A4	SMA233−1	Holder (1)
A5	XTN3+10AFZ	Screw, Loop Antenna Holder (2)
A6	SSA269	Cord, FM Antenna (1)
A7 [EX, EH]	SQF12100	Instruction Book (1)
A7 [XM, XA]	SQF12101	Instruction Book (1)
A7 [XL]	SQF12102	Instruction Book (1)
A8 [XA, XM] only ⚠	SJP5213−1	Plug Adaptor (1)
A9 [XA, XM] only ⚠	SJP5215	Plug Adaptor (1)
PACKING PARTS		
P1 ○	SPP699	Polyethylene Bag, (Silver type) (1)
P1 Ⓚ	SPP649	Polyethylene Bag, (Black type) (1)

Ref. No.	Part No.	Part Name & Description
P2 [XL] only P2 other areas	SPS4432–1 SPS4432	Pad, Left Side (1) Pad, Left Side (1)
P3 [XL] only P3 other areas	SPS4433–1 SPS4433	Pad, Right Side (1) Pad, Right Side (1)
P4 [XL] only P4 other areas	SPG4894 SPG4893	Carton Box (1) Carton Box (1)
P5 Ⓚ	SGK1413	Label (Black Type only) (2)

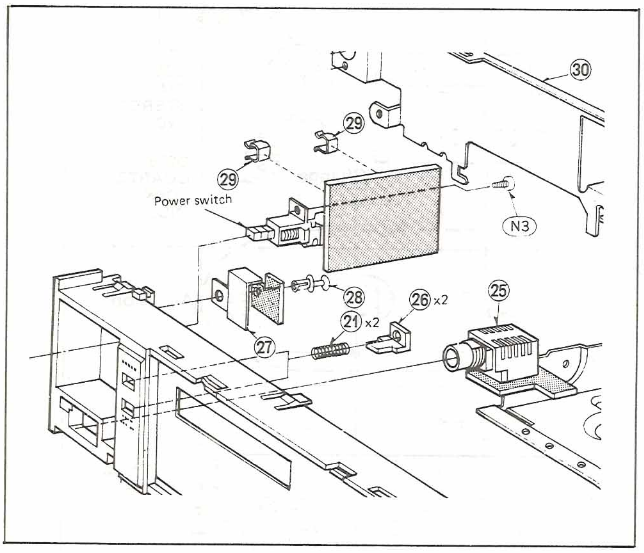
• Change of the exploded view

Change

For [EX, EH, XA, XL, XM] areas


(52) [XL] only
(51) [XL] only
Voltage selector [XA,XM] only
r transformer
N32 [XA,XM] only
N31 [XA,XM] only
N30 [XA,XM] only
N21 [XA,XM] only
N4
N4
N1
㊹
㊸
㊶ x2
㊷ x2
㊵
㊿ [EX,EH,XL,] only
N1
㊴
㊾ [XA,XM] only
N1
N1
N33 [XA,XL,XM] only
AM Allocation Selector [XA,XL,XM] only
㊳
N22 [XA,XL,XM] only
N1
N1
N1 x2
N5
N11
㉘
㊲
N1
㉘

For [M] area


㉚
㉙
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Power switch
N3
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㉖ x2
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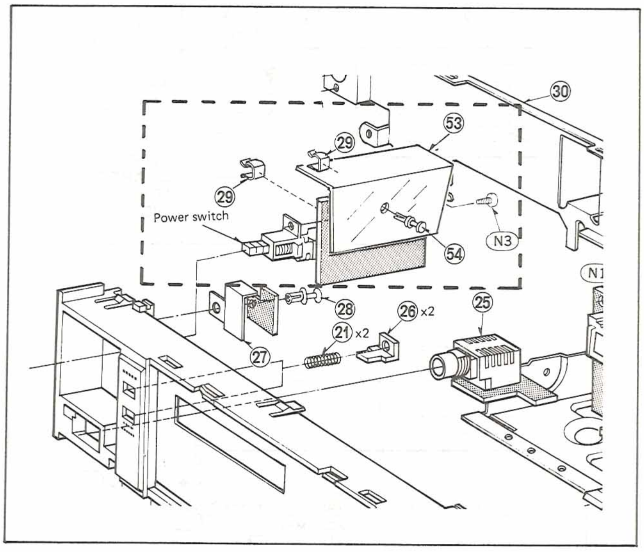
㉑ x2
㉗

Change

For [EX, EH, XA, XL, XM] areas


㉚
(53)
㉙
㉙
Power switch
N3
(54)
N1
㉕
㉘
㉖ x2
㉑ x2
㉗

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